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LIVE ROLL GRIZZLY

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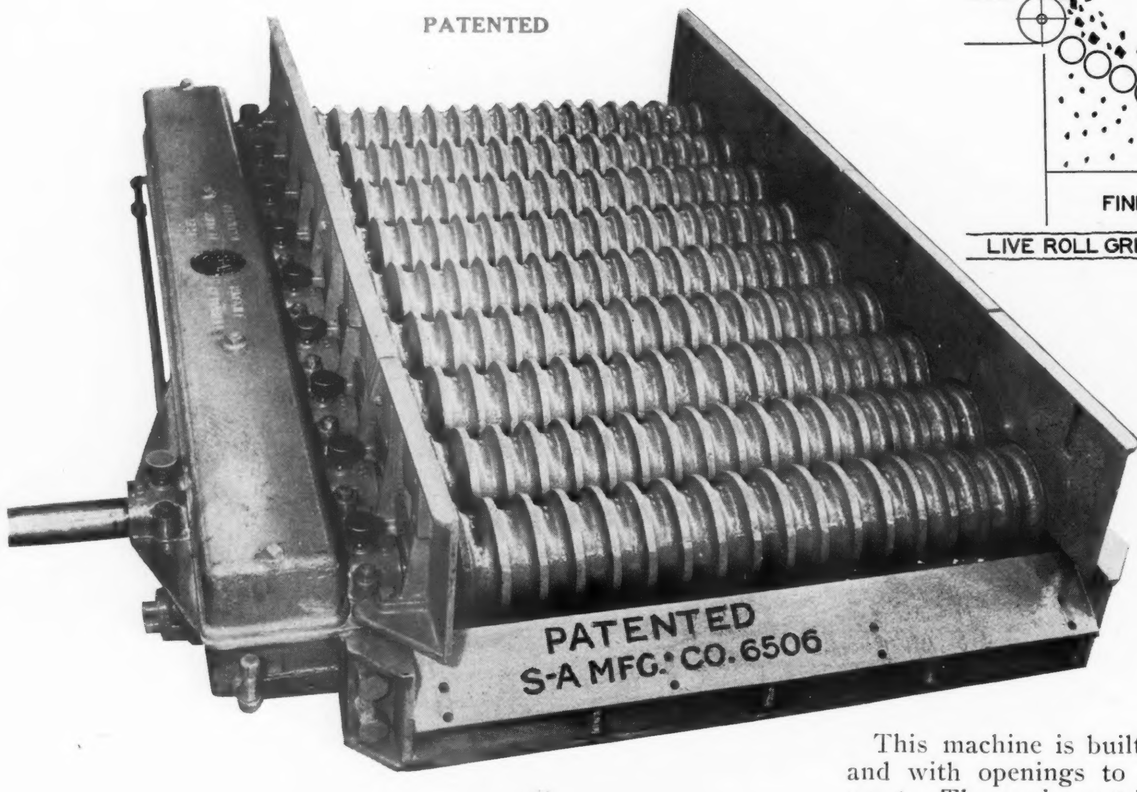

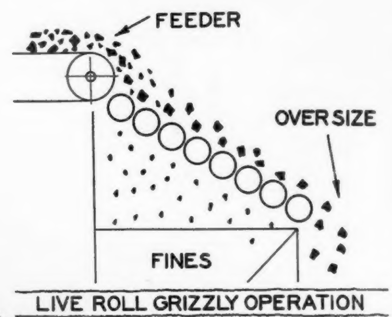

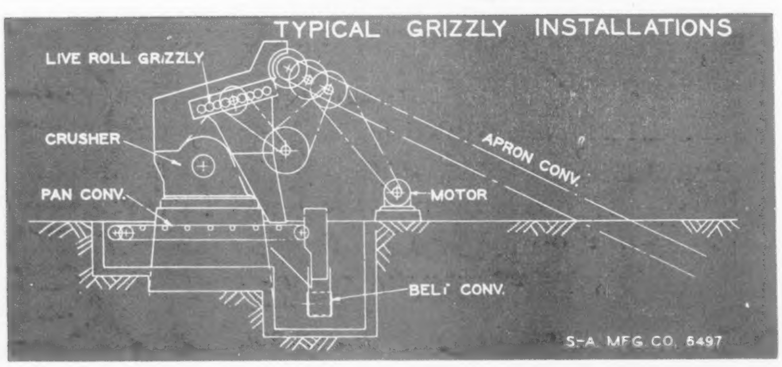

This machine is built in various sizes and with openings to suit the requirements. The equipment is a self-contained machine. The driving mechanism is fully enclosed and the skirt plates are attached rigidly to the frame. A mechanically driven oil pump provides circulation of the lubricant.

There is practically no chance of clogging this grizzly. This applies to the openings thru which the fines pass and also to the flow of oversize across the grizzly.

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Aurora, Illinois
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There are eleven important reasons for the success of this grizzly on tough jobs. Write for the "Eleven Features."

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Rock Products
CEMENT and ENGINEERING NEWS

Volume XXIX | Chicago, April 3, 1926 | Number 7

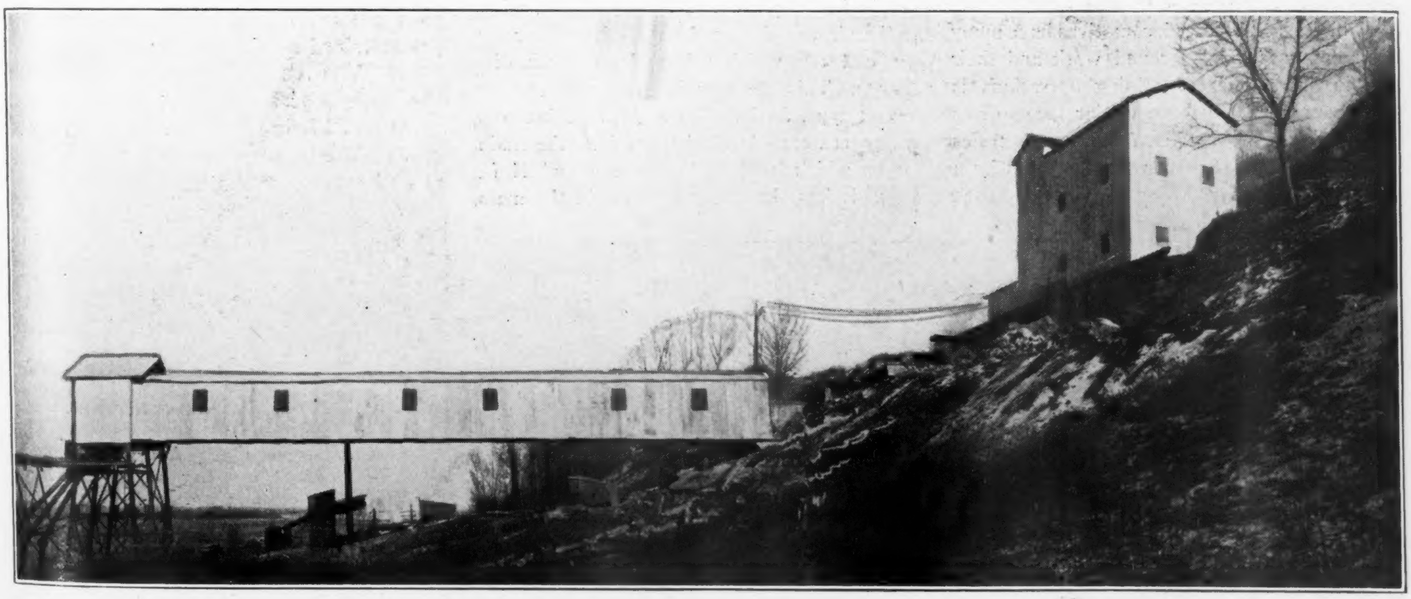
New Crushed Stone Plant of the Missouri Portland Cement Company

Over Four Miles of Underground Workings Developed—Unique Storage System and Excellent Loading System Are Features

THE Missouri Portland Cement Co. of St. Louis, Mo., has had a cement plant at Sugar Creek, about 12 miles out of Kansas City, Mo., for some 15 years. Recently the company has built a crushing plant there for making concrete aggregate, fluxstone, and the like, which went into production the first week in January. The plant has a number of interesting and unusual features, including a unique storage system and a very good loading system. The crushing plant itself embodies the best ideas in recent design and is all steel and concrete construction from the loading trestle on which the stone enters to the hopper from which the finished product goes on the cars.

The plant was designed by the Allis-Chalmers Manufacturing Co., but many of its features are due to J. G. Morgan, superintendent, and P. T. Belfour, who is a chemist at the cement plant at Sugar Creek. Most of the machinery was furnished by the Allis-Chalmers company.

The stone is all mined from underground. For years the Missouri Portland Cement Co. has carried on mining operations at Sugar Creek to supply rock to the cement plant. There are more than four miles of underground working. In the course of these operations they have developed faces that can be profitably worked for crushed stone as well as cement material, so that the new plant can be supplied with stone without changing the usual course of mining operations.



Crushing plant of Missouri Portland Cement Co. at Sugar Creek, Mo. Below the crushing plant (right) are the underground storage bins from which the conveyor belt running through a tunnel and into the housing carries to the hopper, at the left, for loading cars below

The mining system employed is to "carry

a breast" 40 ft. wide. The roof stands very well with this width and the long record of the company in mining is remarkably free from serious accidents. The usual height of the breast is 35 ft. and this takes both limestone and shale in the proper proportions for making cement. In mining for crushed stone only the good limestone is taken out, and it can be recovered very cleanly so that not a trace of shale or other unwanted material goes into the crushed stone. Cleanliness of product is one of the great advantages of removing stone by underground operations.

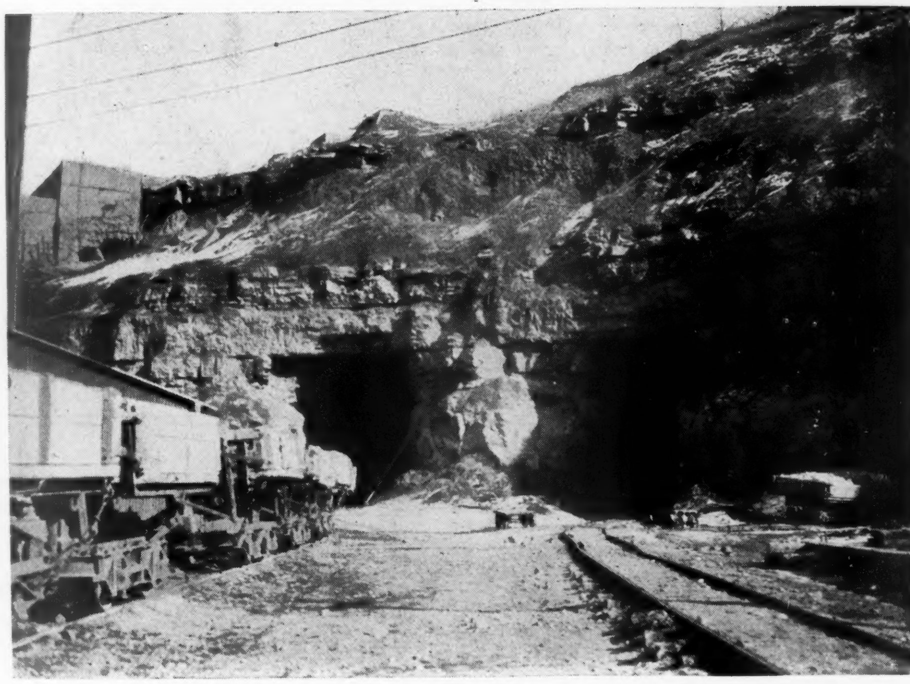
Mining Methods

Hand-pneumatic drills of Ingersoll-Rand and Sullivan make are used, the piston drill not being so well adapted for the rock and the kind of work. These drills are mounted on a post by a collar when used for putting in down holes in benching. For the other holes they are held in the hand.

The heading is put in at the top of the breast and the stone below is worked off in two benches. This is a somewhat safer method of working than to drive the heading below and then slab off the rock above to the height required, as the roof is sure to be left in a good condition. The height of the heading is about 10 ft.

The broken rock is loaded into 4½-yd. Western side-dump cars and pulled to the crusher by locomotives. The company has six of these in use in supplying stone to both the cement plant and the new crushing plant. Three of these are steam dinkies (15- and 20-ton) of Davenport make. The remaining three are Westinghouse storage battery locomotives.

The storage battery locomotives have many advantages for underground work and their use in other sorts of mining operations is quite common. These particular locomotives are equipped with Edison storage batteries which are charged once every 24 hours by a motor generator set. For the present work it is not necessary to set them on charge for a "boosting period" during the day's work.

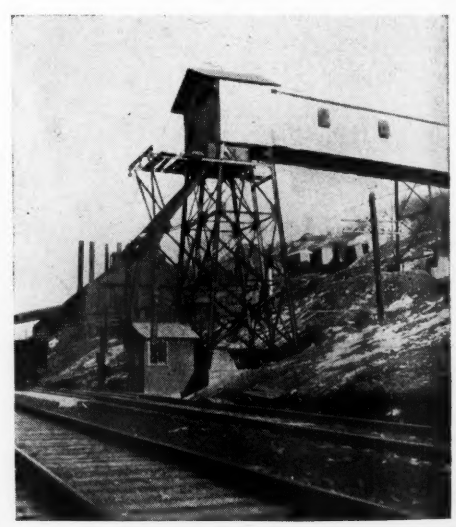


Entrance to underground workings of the Missouri Portland Cement Co.'s quarry

The primary crusher is a No. 10 McCully "Superior" gyratory, set below the ground level and about 5 ft. below the track level. Cars dump directly to this crusher, which is large enough to take a 24-in. piece and this is about the largest size which is brought out of the mine. This crusher breaks everything to 6-in. and finer pieces.

The crusher discharge goes to a "stone box" of steel plate 5 ft. long and 3 ft. wide, to break the fall and to obviate wear on the elevator which raises the crusher discharge. This elevator is of the continuous bucket type, 36 in. wide and 90 ft. between pulley centers. It discharges into the main screen which is 72 in. in diameter and 24 ft. long. It has six screen sections in the main screen, three of 1½-in. perforations and three of 2¼-in. perforations. There is a dust jacket around the first three sections with 1-in. perforations. All perforations are round holes.

The oversize of this screen, 6-in. to 2¼-in., goes to a 10-in. McCully reduction crusher which breaks everything to 2¼-in. and finer. The crusher discharge goes to a stone box, from which it flows into the same elevator that takes the primary crusher discharge and so returns to the screen.

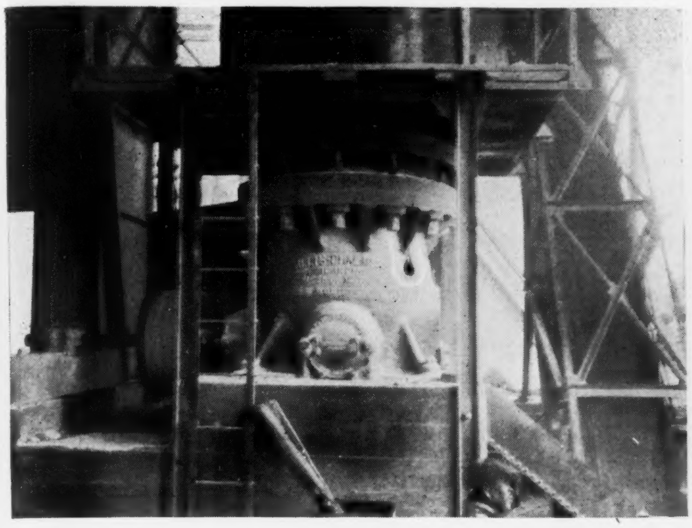


End of gallery and hopper from which direct loading on railroad cars is made

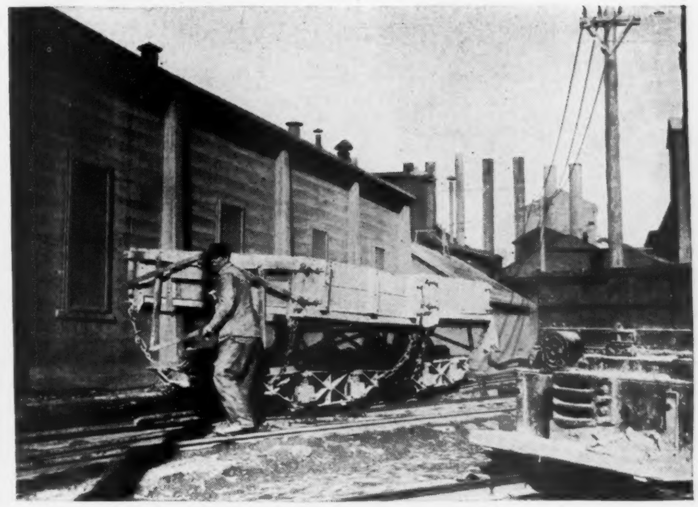
The intermediate size which at present includes everything from 1-in. to 2¼-in. goes by a conveyor belt to the underground stone storage which will be described later.

Everything below 1 in. goes to a pair of Allis-Chalmers shaking screens which are set to shake in opposite directions. These

Cars with broken rock from quarry ready to dump into the crusher



Gyratory crusher which reduces the stone to 6 in. and below



Type of car used for carrying stone to the cement plant

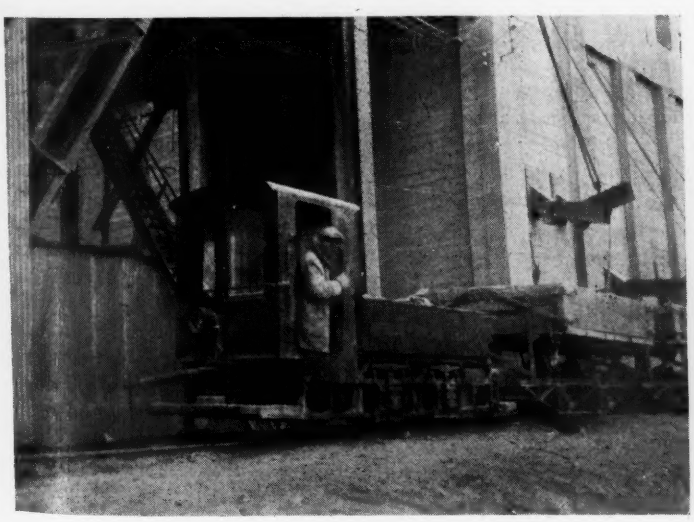
make three products. The coarsest is from 1 in. down to ½ in. and it is sent to a concrete bin. The next size is known as pea size and it contains everything from ½ to ¼ in. The finest size is screenings containing everything from ¼ in. down to dust.

The screenings and the pea size are sent to bins, and the screenings are afterward loaded into cars and hauled to the cement plant to be used for making cement. Some of the pea size may be used in this way if at any time the demand for them is light. But both these may be recovered by the loading belt and sent to railway cars for shipping if this is desired.

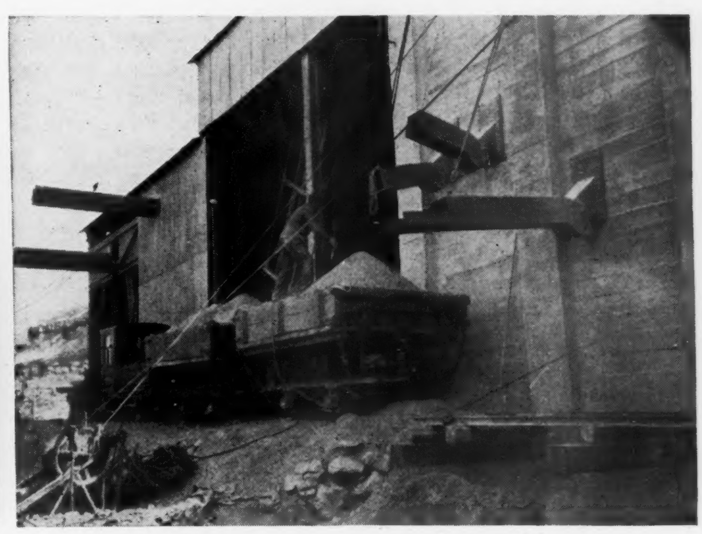
The loading belt is 730 ft. long and 30 in. wide. It passes under the underground storage and the concrete bins in a tunnel and then out into a steel frame gallery to the hopper, from which cars are loaded. Any bin may be drawn by this belt or more than one bin may be drawn if it is wanted to load a mixture of sizes.

Under each bin is a spout to this belt with a reciprocating pan feeder of a type which

The underground storage is an old opening in a ledge whose roofs and walls have been covered with concrete

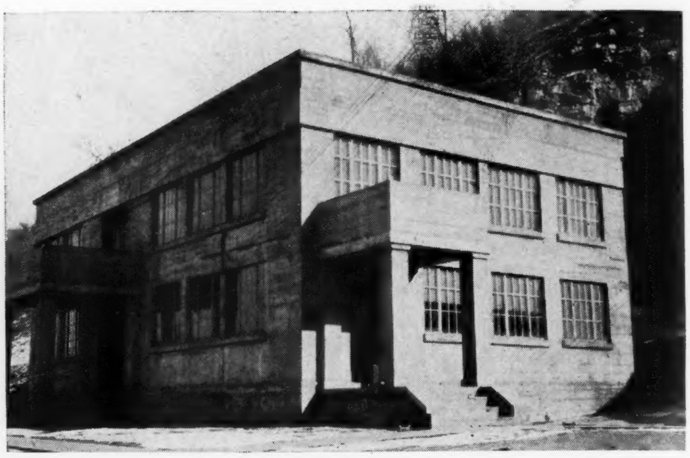


Cars drawn up to the small size bins for loading



Loading screenings and small size stone for cement plant

J. G. Morgan, superintendent at Sugar Creek, Mo.



New office building of the Missouri Portland Cement Co.

has been used by this company for a long time. The pan moves forward and back under the feeder, filling itself on one stroke and emptying itself on the other. The throw or length of stroke is adjustable which regulates the amount fed. There is also a sliding gate on the spout from the bin and this makes another adjustment.

Old Mine Workings Provide Storage

The underground storage, which is the unique feature of the plant, is an old opening into the ledge which has been adapted to the purpose. The walls and roof have been covered with "gunite" concrete which prevents any deterioration and spalling. A belt conveyor near the top supported on a trestle of round timbers brings in the crushed rock and a tripper enables it to be discharged at any point required as the storage fills. The end of the storage toward the plant is a high buttressed concrete wall.

This storage will hold 8000 tons and the stone will always be dry and free from any contamination from dirt or coal dust which might be brought in by the wind if the storage was outside. The rock is always in the best condition to ship.

The conveyors are somewhat unusual in that they employ the single spool-shaped troughing idler in the place of the three-roll or five-roll troughing idler which is in such general use. But these spool idlers have self-oiling bearings of the chain type and hence turn with very little friction. The conveyors are very substantially built and supported on steel channel beams, which is a guarantee that they will remain in line. All conveyors and elevators are driven by motors through James Bros. speed reducers.

Steel Pipe for Stone Spouts

The loading hopper is directly over the Howe track scales so that cars may be loaded to a definite weight, neither over nor under the weight desired. There are three spouts leading from the hopper to the car, and these are of 10-in. steel pipe with universal joints. By use of these the car may be loaded evenly both from side to side and from one end to the other.

A new office building has been recently erected at the Sugar Creek plant of the Missouri Portland Cement Co., which is one of the finest office structures to be found anywhere in connection with a rock products plant. It is of reinforced concrete throughout, with abundant windows in steel sashes which are set into the concrete to prevent dust from entering. The building is cooled in summer as well as warmed in winter and the cooling system is one which the writer has never seen before. It consists of a fan drawing air from the underground workings which are of practically the same temperature throughout the year. Tests have shown a temperature of 60 deg. F. inside the mine when the thermometer stood at 100 F. on the outside. Naturally the air drawn through these workings is of a comfortable temperature on even the hottest days.

Part of Cement Mill in Old Mine Workings

The old workings are bone dry and of so even a temperature winter and summer that the company has found them excellent for many purposes. Some of them are used for storage and one, which has been widened out into a good sized room is used to house a grinding plant of the cement mill. It contains a kominuter and three tube mills and the machinery necessary to drive and feed these. Just beyond this is a clinker storage in which the clinker for 140,000 bbl. of cement may be stored. This is probably the most unique housing of a cement mill in the world—but a very satisfactory housing at that.

The main offices of the Missouri Portland Cement Co. are in St. Louis, Mo., near which is one of the company's cement plants. It is a large producer of sand and gravel as well as cement and crushed stone, with plants near St. Louis and at Memphis, Tenn.

J. G. Morgan is superintendent of the plant at Sugar Creek, and P. F. Belfour is in charge of chemical and physical testing. The president of the Missouri Portland Cement Co. is H. L. Block. C. G. Besch, C. A. Homer, R. S. Conlon, and G. M. Block are vice-presidents; John H. Soell is secretary.

Progress in Cement Testing

THE work of Committee C-1 of the American Society for Testing Materials on portland cement, among other things, is making an intensive study of compression tests of cement that have been made by sub-committee VII on strength. These tests, which, it is estimated, have cost upwards of $10,000, were designed to furnish more information in regard to the following factors:

(1) A satisfactory type of mortar compression test piece;

(2) The effect of different percentages of mixing water in producing more uniform strength in the usual types of test specimen;

(3) The relation of the strength developed by these compression test pieces to the tensile briquettes, both neat and 1:3 standard sand mortar;

(4) The strength developed by both the compression and tensile test specimens at 72 hours, and

(5) The strength developed by these at 72 hours by accelerated aging.

In the past few months the data have been critically analyzed under the direction of P. H. Bates and sub-committee VII will now begin an intensive study of the findings.

"The Manual on Cement Testing" that was offered to the society at its annual meeting in June and accepted for publication was designed by the committee as a step towards more accurately defining the methods of testing cement. The "Manual" emphasizes those factors which may affect the results of tests and calls attention to less apparent influences which are important but are sometimes overlooked. The "Manual" has been well received. The first edition of 4000 copies has been completely exhausted and a second edition is being printed.

The collaborative work reported by subcommittee VII constitutes a further step to determine what changes or refinements are necessary in methods of testing cement to bring about greater concordance of test results.

Other Types of Crushers Than Gyratories

Jaw, Roll, Hammer and Disc Crushers

By Hugo W. Weimer
Consulting Engineer, Milwaukee, Wis.

GYRATORY CRUSHERS as discussed in the two preceding articles are well known to most operators, having been in general use for many years. The jaw type is likewise an old established crusher.

There are two general types of jaw crushers, and to call attention to the two different principles of jaw movements as well as to briefly describe single-roll crushers, hammer crushers, disc type crushers and double-roll crushers is the aim of the writer in presenting this article.

Each type of crusher has its particular field of usefulness; and judging from the progress being made in the design and construction of each, there is need for all types. To properly choose the best for each installation is most important, and this discussion will no doubt be of assistance to some operators.

Hugo W. Weimer, a designer of crushers and a consulting engineer on all problems relating to crushing plant design and operation

Dodge Type Jaw Crushers

This design of jaw crusher has the greatest motion at the mouth or feed opening and the least at the bottom or discharge opening. The result of this arrangement makes it possible to produce a small and uniform product with a comparatively large size of feed opening. While it is possible to make a large ratio of reduction, the capacity is limited, thus the usefulness of this design is also limited.

The capacities of jaw crushers are governed by the same features as the gyratory crushers, explained in my first article. The length of the discharge opening, the amount of motion at this point and the number of jaw movements per minute are the three governing features.

Since the Dodge type of crusher has a comparatively small amount of motion at the discharge point and as the number of jaw movements is limited owing to its construction, the capacity is likewise limited.

Fig. 1 illustrates a common design of the Dodge crusher. It has one fixed and one movable jaw and is actuated by an eccentric on the drive shaft giving the motion to the movable jaw which has an extension attached to the eccentric. Fig. 2 is a modified design of the Dodge crusher. The movement is imparted direct to the uuper part of the movable jaw by an eccentric shaft and the lower support, to take care of the vertical motion of the jaw, has a toggle arrangement.

Since the Dodge crusher is only applicable where a small tonnage of a fine product is desired, it is built only in small sizes.

DODGE TYPE JAW CRUSHERS

Size of feed opening	Ring size of product	Capacity, tons per hr.	H.P. required
4 x 6 in.	½ to 1½ in.	¾ to 2	3
7 x 9 in.	½ to 2½ in.	1¼ to 4	5
8 x 12 in.	½ to 2¾ in.	1¾ to 6	10
10 x 16 in.	¾ to 3 in.	3 to 10	15

Blake Type Jaw Crusher

Similar to the crushing action of the original gyratory crusher is the Blake type of jaw crusher. The motion of the movable jaw at the bottom is greater than at the top. Fig. 3 illustrates one of the original designs as built for the smaller sizes. Fig. 4 shows one of the most recent designs for the larger sizes. As in the Dodge crusher, there is one fixed and one movable jaw, the difference being that the movable jaw of the Blake type is pivoted at the upper end.

The toggle arrangement between the ec-

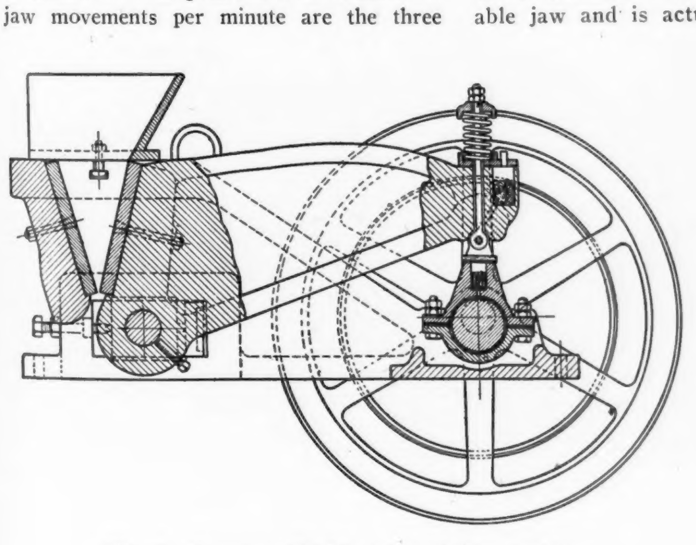


Fig. 1. Common Dodge type of jaw crusher

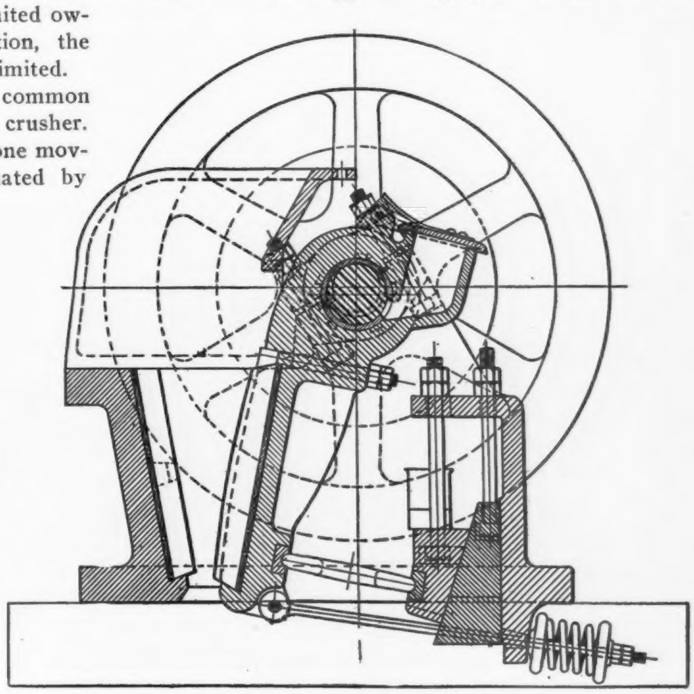


Fig. 2. Modified form of Dodge type jaw crusher

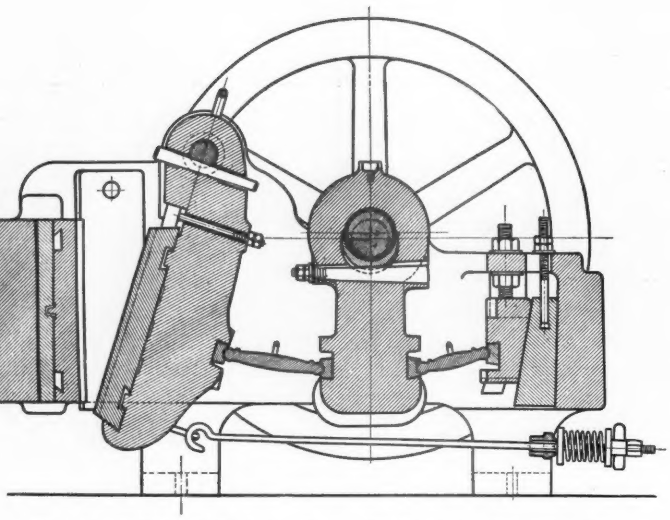


Fig. 3. Original design of the Blake type jaw crusher

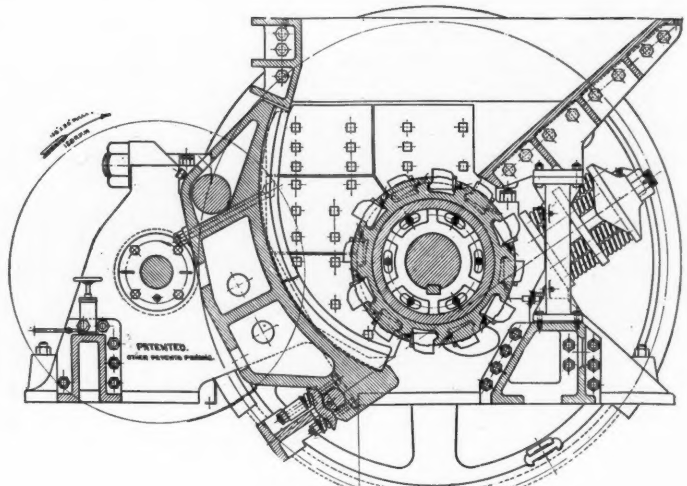


Fig. 5. Single-roll type of crusher

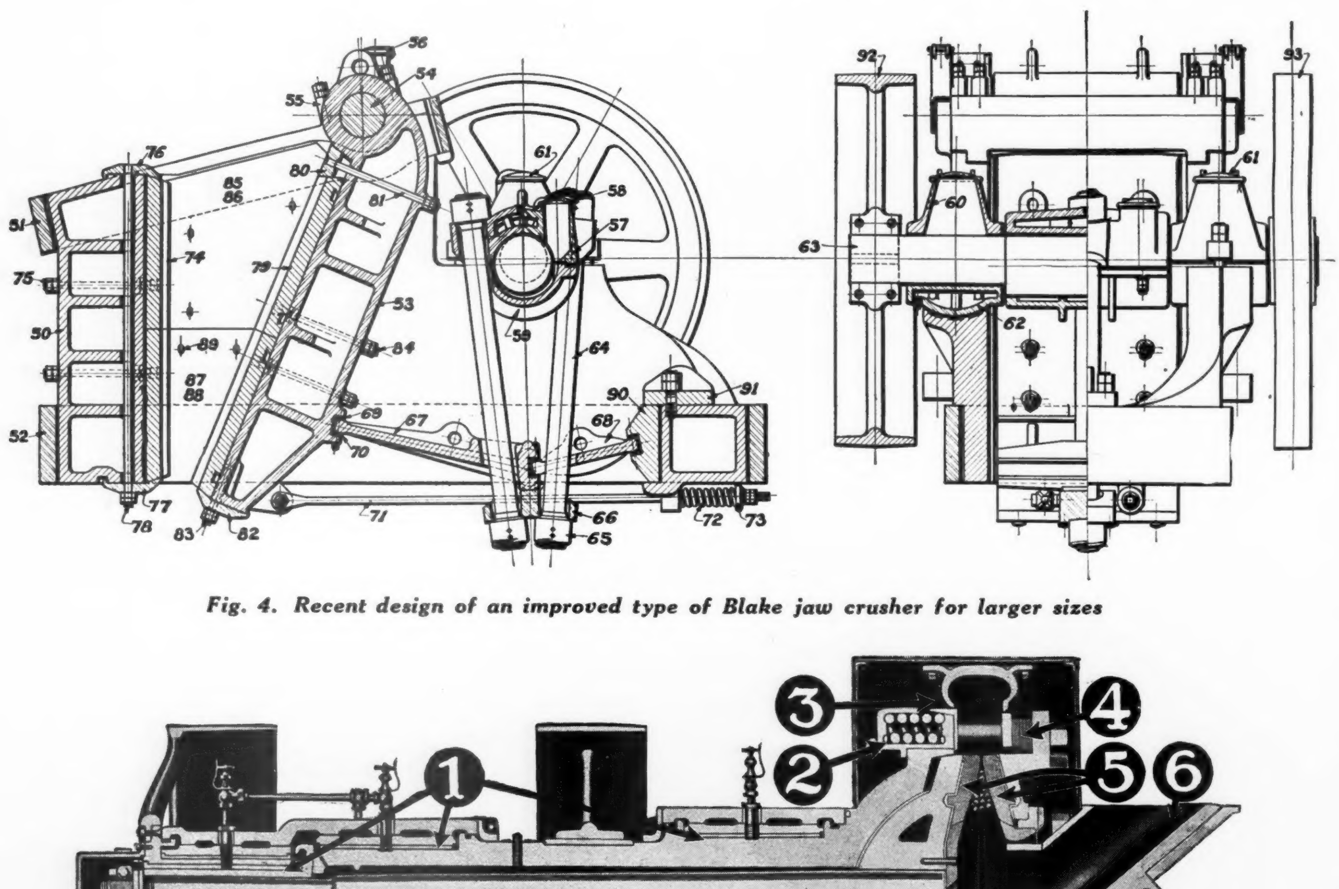
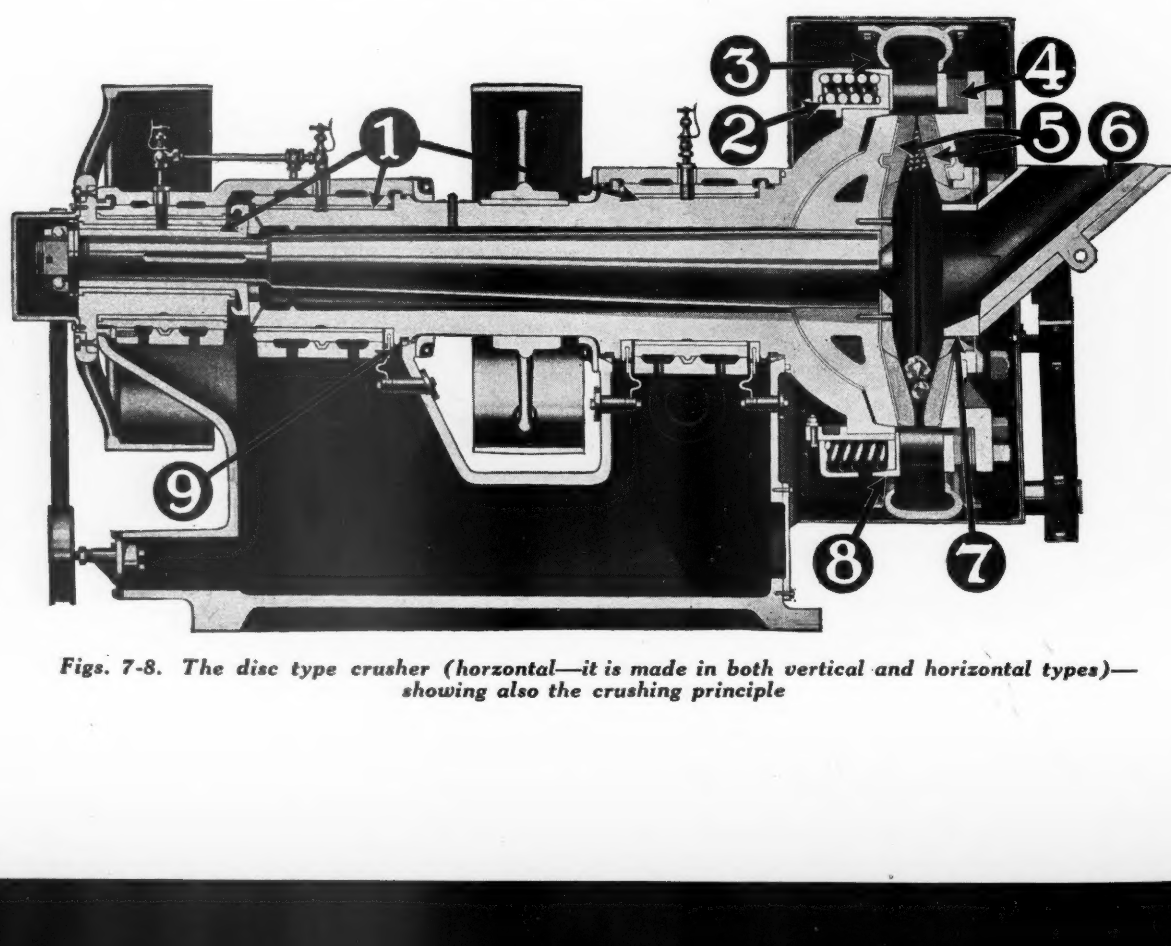


Fig. 4. Recent design of an improved type of Blake jaw crusher for larger sizes



Figs. 7-8. The disc type crusher (horzontal—it is made in both vertical and horizontal types)—showing also the crushing principle

centric drive shaft and the movable jaw provides a good leverage action which together with the flywheel on the drive shaft makes this type of crusher suitable for the hardest kind of work.

By referring to the table of sizes it will be readily seen that this type of crusher cannot be classed as the most desirable secondary or fine crusher. Where the nature of the rock will permit, the Blake crusher with its large unobstructed rectangular feed opening makes it an excellent primary crusher.

The number of reciprocating parts limits the speed or number of jaw movements per minute, therefore the capacity is likewise limited, but this feature in many cases does not affect its installation as a primary crusher, because the large and desirable feed opening is far more important than large capacity.

A well designed and well built Blake type jaw crusher with its rugged construction and accessibility has much in its favor. The table of sizes, which is an average as compiled by the writer, shows a wide range of sizes to select from and lists approximate capacities and power requirements. A warning not to attempt too great a ratio of reduction applies to the jaw as well as to the gyratory crusher. The approximate minimum ring sizes of product as produced by the various sizes of crushers is also listed.

Fig. 6. Well-known type of hammer crusher

BLAKE TYPE JAW CRUSHERS

Size of feed opening	Ring size of product	Capacity, tons per hr.	Av. H.P. required
10 x 7 in.	1 to 3 in.	3 to 8	6
15 x 9 in.	1¾ to 4 in.	8 to 20	10
20 x 10 in.	2½ to 6 in.	20 to 45	20
24 x 15 in.	2¾ to 6½ in.	30 to 70	30
30 x 20 in.	3 to 7 in.	35 to 90	35
36 x 24 in.	3¾ to 7½ in.	60 to 175	70
42 x 40 in.	5½ to 10 in.	120 to 220	110
48 x 42 in.	5½ to 10 in.	180 to 320	160
60 x 48 in.	6½ to 12 in.	200 to 380	180
72 x 54 in.	8 to 12 in.	280 to 410	200
84 x 66 in.	12 to 16 in.	450 to 600	300

Single-Roll Crushers

When the material to be crushed is not too abrasive and has a crushing strength not exceeding that of soft limestone, then the single-roll crusher may be used to advantage. These crushers are built in various sizes by a number of manufacturers and Fig. 5 illustrates one of the designs. One of the crushing elements is fixed or stationary, while the other is a revolving member. Large capacity, absence of slabs and minimum amount of fines in the product are advantageous features, but another important point is the forced discharge of the product, which means that choking will not occur on account of the presence of clay or dirt in the feed.

The sizes of single-roll crushers are based on the diameter and width of face of the revolving roll and are made up to 60 in. diameter and 84 in. wide. Products from ¾ to 10 in. in size are produced with capacities from 5 to 1500 tons per hour.

Hammer Crushers

Similar to the single-roll crusher, the hammer type of crusher is a high speed machine. It has one fixed and one movable crushing surface. The revolving shaft with the hammers attached operates at a speed of 600 to 1200 r.p.m. Built in various sizes up to a hopper opening of 72x48 in., this type of crusher can produce material from ¼ to 4 in. in size with a capacity of 3 to 300 tons per hour. All grades of stone cannot be crushed economically in the hammer type, the use being generally limited to soft grades of limestone and material of similar hardness. Fig. 6 illustrates a typical hammer crusher

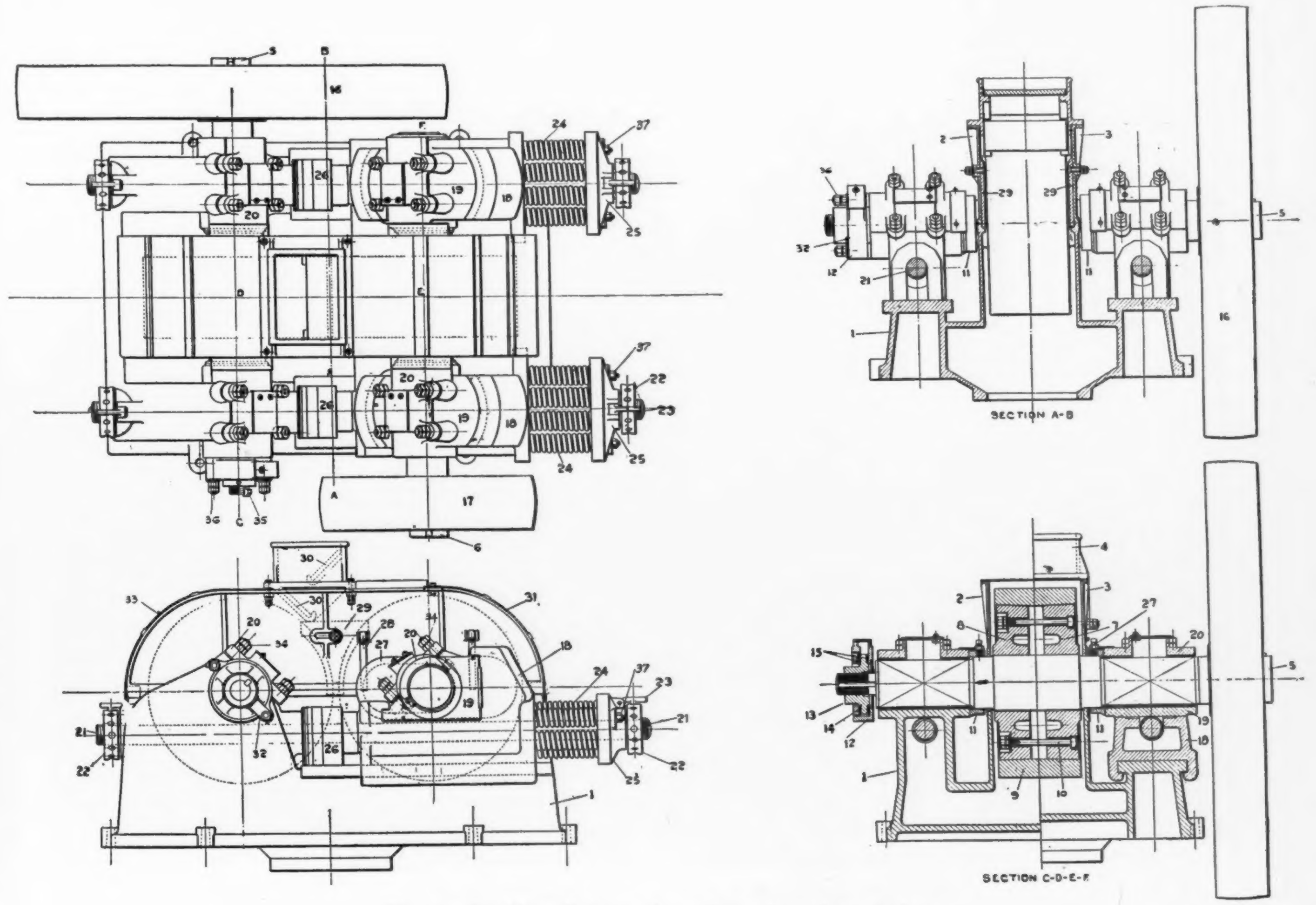


Fig. 9. Double-roll type of crusher of modern design

design and the action of the stone in passing through the crusher.

Disc Type Crushers

As a recrusher or secondary crusher, the disc type, having a discharge opening area a great deal larger than the feed opening area and employing centrifugal force to discharge the finished product, together with the range of adjustment to change the size of the product, makes this a desirable unit in many installations. Fig. 7 shows a cross-section of a disc type crusher and Fig. 8 the disc principle of crushing.

The crushing is done between two discs rotating in the same direction, but supported at an angle to each other. This provides a wider opening between the edges at one point than at the opposite part on the circumference. Stone fed through the center opening in one disc is thrown by centrifugal force to the outer edge of the discs, where the crushing is done and the product discharged.

The outside diameter of the disc is the determining size of the crusher. They are manufactured in four sizes, 18 in., 24 in., 36 in. and 48 in. diameter respectively. The maximum size of feed ranges from 1½ in. to 6½ in. and the product from ⅜ in. to 2½ in. with capacities of 5 to 120 tons per hour.

Double-Roll Crushers

Fig. 9 illustrates a typical double-roll crusher, having two rolls revolving in opposite directions and crushing the material between their faces, each roll being driven by its own belt. This is an economical unit for recrushing in many cases, providing the tonnage is sufficient to warrant installing a heavy-type, high-speed roll and providing a steady feed. This type of crusher has not met with the success in the stone industry that it should have and in the writer's opinion the installations in many cases were not satisfactory due to the rolls being too small in diameter to properly nip the feed and not being heavy enough for the working requirements.

They are built in various sizes, from 12 in. to 78 in. diameter and 10 in. to 30 in. face. On account of the larger rolls having greater weight, it is seldom advisable to install a roll less than 36 in. or 42 in. diameter. The peripheral speed of the roll faces ranges from 500 to 1500 ft. per min. for smooth face rolls and from 500 to 1200 ft. for corrugated rolls. The horsepower required will vary from ½ to 1 hp. per ton of material crushed per hour. A safe ratio of reduction is about 4 to 1.

Rolls are limited as to the largest size of feed permissible. As a guide to determine this figure the following table will be of assistance. Add the dimension *A* to the size of product desired, which is the space between the roll face, and the maximum size of feed is obtained.

Diameter of roll	"A"
12 in.	½ in.
24 in.	1 in.
30 in.	1¼ in.
36 in.	1½ in.
42 in.	1¾ in.
48 in.	2 in.
54 in.	2 in.
60 in.	2½ in.
72 in.	2¾ in.
78 in.	3 in.

The theoretical capacity of a set of crushing rolls is in direct relation to the width of face in inches *(W)*, opening between roll faces in inches *(O)* and the peripheral speed in feet per minute *(S)*. To obtain the capacity in tons of 2000 lb. per hour, use this formula.

$$\frac{W \times O \times S \times 60}{144 \times 20} = \text{Theoretical capacity in tons of 2000 lb. per hour.}$$

We cannot assume that the full face will be working at all times, therefore to obtain the actual capacity, divide the theoretical by three.

Duty on Imported Fluorspar To Be Investigated

ACTING upon a complaint by domestic producers who seek an increase of 50% in the duty on fluorspar under the flexible provision of the tariff act, the Tariff Commission has ordered an investigation regarding that product. The present duty is $5.60 per ton. The complaint is understood to state that imports of fluorspar are large and that prices of the foreign material are so low that domestic producers cannot compete.

The secretary of the tariff commission has ordered a public hearing on fluorspar at a date to be set. The notice states:

The United States Tariff Commission on this 8th day of January, 1926, for the purpose of assisting the President in the exercise of the powers vested in him by section 315 of Title III of the tariff act of 1922, and under the powers granted by law and pursuant to the rules and regulations of the commission, hereby orders an investigation of the differences in costs of production of, and of all other facts and conditions enumerated in said section with respect to, the article described in paragraph 207 of Title I of said tariff act, namely: Fluorspar, being wholly or in part the growth or product of the United States, and of and with respect to like or similar articles wholly or in part the growth or product of competing foreign countries.

Ordered further, that all parties interested shall be given opportunity to be present to produce evidence, and to be heard at a public hearing in said investigation to be held at the office of the commission in Washington, D. C., or at such other place or places as the commission may designate on a date hereafter to be fixed, of which said public hearing prior public notice shall be given by publication once each week for two successive weeks in Treasury Decisions, published by the Department of the Treasury, and in Commerce Reports, published by the Department of Commerce, copies of which said publications are obtainable from the Superintendent of Documents of the Government Printing Office in Washington, D. C.

And ordered further, that public notice of said investigation shall be given by posting a copy of this order for 30 days at the principal office of the commission in the city of Washington, D. C., and at the office of the commission at the port of New York, and by publishing a copy of this order once a week for two successive weeks in said Treasury Decisions and in said Commerce Reports.

Rock Dusting of Coal Mines on the Increase

A REPORT by Edward Steidle, supervisor of the co-operative coal mining courses at Carnegie Institute of Technology, who has been making a study of means to prevent coal dust explosions in connection with the Bureau of Mines investigations, presents data on the increase in the use of rock dusting during the past year, which emphasize the importance which coal mine operators place on the prevention of explosions. During 1924 only one company in America practiced rock dusting on any large scale, but at present no less than 211 mines are rock dusted. However, this represents only about 4% of the total number of bituminous mines in the United States.—*Chicago Journal of Commerce.*

Manganese as a Stimulant to Plant Growth

RECENT investigations carried on at the Agricultural Experiment Station, Lexington, Ky., tend to show that manganese is quite important for the growth of plants. Since traces of manganese are nearly always to be found in limestones, gypsum, phosphates, etc., extra emphasis may be placed on the use of mineral fertilizers for the soil. A complete account of the experiments and the results obtained may be found in the February number of *Industrial and Engineering Chemistry.*

Defiance of Quarry Company's Mandamus Leads to Bench Arrest and Fine

REFUSAL to sign a warrant drawn for payment of $287 to the Big Bend Quarry Co. for rock furnished St. Louis county, Mo., for road maintenance, led to the imposition of a $500 fine on Judge R. S. Smiley, presiding judge of the county court. In addition to this, Judge Wurdemann of the Circuit Court ordered his commitment to jail until this fine was paid. A stay of execution was later granted on the jail sentence.

Judge Smiley was cited into court for disobeyal of a writ of mandamus secured by the quarry company from Circuit Judge Wurdermann to force him to sign the warrant for payment. The payment warrant could not be cashed until the three county judges had signed it and two of the judges did so, but Judge Smiley refused on the grounds that there was no money left of the road funds to pay the warrant. His refusal led to the subsequent actions which resulted in action of the Circuit Court.—*St. Louis (Mo.) Times.*

Rock Products Industries in South Developing Rapidly

Plants Running Steadily—Outlook for Future Decidedly Optimistic —Great Progress Being Made in Manufacture of Better Aggregate

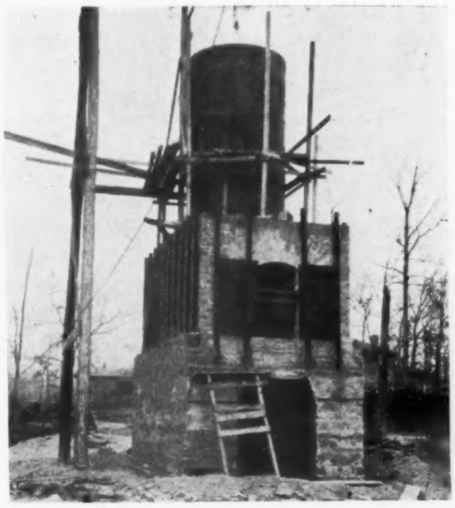
By Edmund Shaw
Editor, Rock Products

THE Southern Mineral Co. of New Orleans is putting up a 10-ton lime kiln there which is of much more importance than its size would indicate. It was designed by John C. Schaffer, president of the Schaffer Engineering Co., Pittsburgh, Penn., to serve as a "pilot" for a plant of perhaps 250 tons, and as it is on the only good limestone deposit for some hundreds of miles around and in a country where paper mills, oil refineries, and a brick building business supply an ample market, it is of more than local importance. At present all the lime used in this section is brought in from Arkansas, Alabama, and some from eastern Tennessee.

According to one authority there are only three exposures of limestone in Louisiana, and the deposit at Winnfield is the only one that promises much in a commercial way. The others are of impure limestone; one contains considerable silica and nodules of pyrites, and the other has only produced a little agricultural lime. But the Winnfield deposit is of high calcium stone and the lime which was burned from it in an experimental kiln that was made on the ground from an oil drum has been tested and found to satisfy the exacting requirements of paper making and oil refining. The stone is banded blue and white and the white portion seems to be largely of calcite.

Limestone Overlies Salt Dome

Louisiana, like all the gulf coast country, is of new land, mainly of delta origin, and it is interesting to find this little island of old limestone in the middle of it. The deposit will not cover more than 200 acres. It overlies one of the "salt domes" which are drilled for oil and natural gas in Louisiana. This dome has been drilled, and for the first 900 ft. the drill passed through limestone. The upper part is broken and cut by erosion channels which are filled with clay and dirt, so all the feed to the kiln will have to be washed.



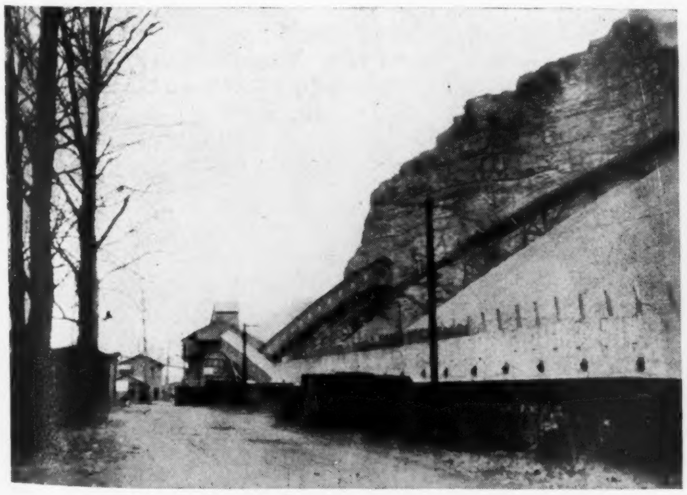
New lime kiln of the Southern Mineral Co., which is on the only extensive limestone deposit in Louisiana

Fortunately, there is ample proof that it can be washed very cleanly. The company operates a crushed stone plant producing about 500 tons daily and washes all but the coarser pieces. Both log washers and washing cylinders are used. Only the log washer was in service when I visited the plant, but the product was as clean as anyone could desire to see it.

Louisiana Sand and Gravel Industry

Winnfield is between Alexandria and Monroe, two towns which are centers of sand and gravel production. There are no plants at Alexandria, but five are situated around the city at distances from 14 to 30 miles. There are two others at Lecontte and two near Monroe. Most of these are dredging plants, but two operate steam shovels and one a dragline. I was told that 90% of the production went into road building, of which a great deal is going on in Louisiana at the present time. The crushed stone from Winnfield is mostly used in road bases.

Alexandria and Monroe are clean and prosperous small cities. Petroleum, natural



Plant and storage of the Big Rock Stone Co., near Little Rock, Ark.

Quarry face of Big Rock Co.'s deposit which is a quartzite although called a granite or trap rock

Part of the Southern Mineral Co.'s quarry at Winnfield, La., showing the broken nature of the deposit which overlies a salt dome

New plant of the Little Rock Sand and Material Co., located near the Big Rock quarry on the Arkansas river —a dredging operation

gas, and timber have built them up in the last few years, and while the timber is being cut away some steps are taken toward reforesting the ground. Some of the paper mills have bought sufficient acreage to run on indefinitely, cutting only the mature trees each year. This is important to the lime industry as it insures a perpetual market.

I went from Alexandria to Little Rock, Ark., which I remembered from years back as a town of perhaps 35,000 and found to be a city of twice that population. It has paved many streets and built many buildings, and bridges in the past two years, but at the present time building is somewhat slack. However, there is a good road and street program promised for the coming season, besides considerable general construction.

Arkansas is strong for good roads. There are already 750 miles of paved road, 3000 miles of graveled road, and 1800 miles of improved and graded road which is to be graveled or paved later on. About 600 miles are under construction. The money comes from a 4-cent gasoline tax. This is a good record for a state with 1,750,000 people.

Sand and Gravel of Glacial Origin

Dr. John C. Branner, the state geologist, gave me a lot of interesting information about the rock products industries of the state (which are larger than the population would indicate), and the undeveloped resources. The eastern part. along the Mississippi, is of tertiary and quarternary origin, mainly delta land. In this is the famous Crowley's ridge, the long chain of hills that extends from north of the Missouri line to a point 50 miles south of Memphis, on the river. At least one good-sized book has been written on the ridge and several shorter reports, as geologists are not agreed as to its origin. Its economic importance is due to the sand and gravel deposits it contains, which have been of the greatest value in road building, for the surrounding land is mostly silt and loam. The sand and gravel are said to be of glacial origin and were presumably transported by water from moraines to the north, a hundred miles and more.

Hill Country Rich in Minerals

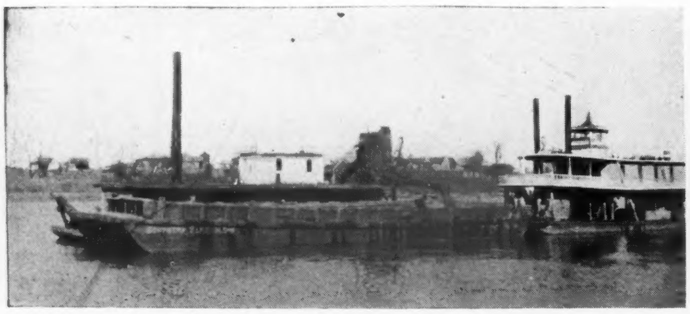
West of this delta country the Ozark region begins. Little Rock is just at the edge of the hill country. West and to the north and south are found the older rocks associated with minerals of commercial importance in such states as Pennsylvania; that is, the carboniferous rocks and the Devonian, Silurian, Ordovician, and Cambrian rocks below them. And as in the eastern states we find large and workable deposits of coal, petroleum, zinc, manganese, and other metals in these rocks, and limestone in abundance. There are three or four good-sized lime plants in the state; chalk is worked for whiting and asphalt filler in the southwestern part; some development has been done on rock asphalt beds and there are a number of crushed stone and sand and gravel plants. The newest rock products industry is a peculiar one. The General Electric Co. has bought land on Crystal Mountain, near Hot Springs and is working it for quartz crystals which are to be used for making fused quartz. This was not heard of a few years ago, but now it is a regular article of commerce. The quartz has to be very pure, and Brazil was the only source of supply until this deposit was opened.

Arkansas has no cement plant, although the state uses nearly a million barrels yearly. Some efforts have been made to get one of the large cement manufacturing companies to build in the state. There is abundant limestone and clay not so far from Little Rock, and near the city is a deposit of tertiary limestone which may have cement making possibilities.

Largest Bauxite Deposits in the United States

Near Little Rock are some inclusions of igneous rock which are of the greatest importance to the whole country because the bauxite from which aluminum is made comes from them. It is a decomposition product of the gray granite in these rocks, and while bauxite has been found in Georgia and other southern states, practically all of our domestic supply comes from the mines near Little Rock.

There are two kinds of granite, gray and blue. The gray makes a beautiful monumental stone, the polished surface having a stellated appearance from the way the crystals are arranged. The blue granite would be a good stone to crush for aggregate, as its crushing strength is only 16,000 lb. to the inch. The gray granite crushes at 30,000 lb. However, Little Rock is not suffering for crushed stone as its wants are amply supplied from the plant and quarry of the Big Rock Stone Co., which is about five miles above the city on the river. This is a veteran in stone crushing



Dredge and tow boat of the Southern Sand and Material Co., Little Rock, Ark.

Washing plant of the Southern Sand and Materials Co., Little Rock, Ark.

Gravel pit of the Ball-Benton Gravel Co. which is worked by drilling and blasting

Washing plant of the Ball-Benton Gravel Co. at Benton, Ark.

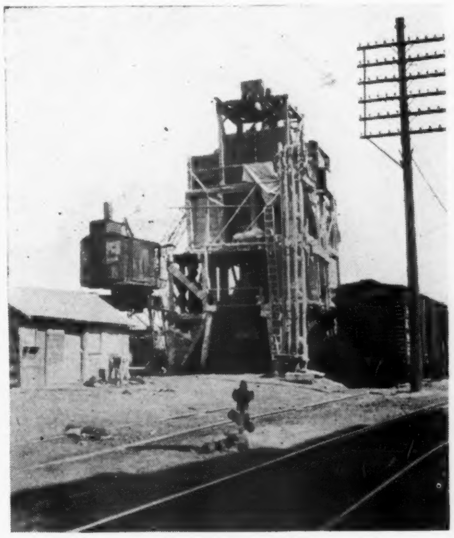
plants as it has been in operation for 30 years. The quarry face is over half a mile long and 250 ft. high at the point where work is now going on. But the plant was a good one in the beginning and so it is a good one now. Very little besides ordinary repairs has had to be done to it to keep it up to date. One of its features is an extensive storage system with conveyor belts for handling in and out of storage. The recovery belt is 450 ft. centers and runs in a reinforced concrete tunnel which extends under all the storage piles.

Unique Methods of Working Quarry Faces

Locally the rock is spoken of as granite and sometimes "trap," but it is really a quartzite and its sedimentary origin shows plainly in the quarry face. The quarry is worked by a system which is unique in the writer's knowledge—a combination of drill hole blasting and "coyote holing." The top 150 ft. or so are shot down with well drill holes and the remainder with coyote holes which are loaded with dynamite and not with black powder. Very little pop shooting is necessary, the ground breaking to a size where the steam shovels and the No. 9 primary crusher can handle it.

Sand Bars in Arkansas River the Usual Source for This Material

There is gravel in the Arkansas river, but not much of it at Little Rock. The Southern Material and Construction Co. has a plant in the city and the greater part of the output is of sand, which comes from bars in the river. The dredge has a 10-in. pump, steam-driven, and it pumps



Mixed concrete plant of the Southern Sand and Material Co., which is in the heart of Little Rock

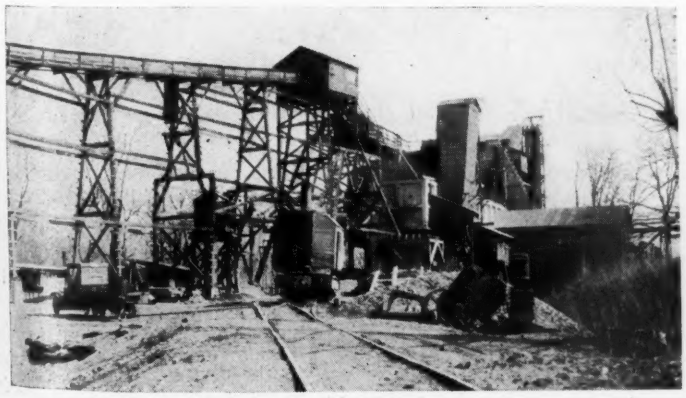
on to barges which are unloaded into a hopper at the washing plant dock by a large stiff-leg derrick. The material is fed by a belt to the plant, which has screens for separating the gravel from the sand and sand boxes of the chain drag type. There are unusual facilities for making rail shipments as the plant stands between the Missouri Pacific and Rock Island railroads and can load a car for either road directly from the bins. This plant was built about two years ago.

This company has a yard in the heart of the town on the river bank, from which it makes truck deliveries and where it has also a very successful mixed concrete plant. Little Rock has passed the season of doubt which most cities have to go through when mixed concrete plants are established in them, and gives its custom freely to this plant. Crushed stone from the Big Rock quarry is used as coarse aggregate.

There is another sand company near the city, that of the Little Rock Sand and Material Co., which has a plant near the Big Rock quarry. It is a neat and well-designed layout with an 8-in. dredge and a washing plant that has a revolving screen and five automatic sand settling boxes. It had just been completed on the day that I visited it and had not begun producing.

Blasting Operations of the Quarry Applied to Gravel Pits

The largest sand and gravel operation in the state is at Benton near Hot Springs and it is now producing around 100 cars daily. Much of the production goes into washed gravel ballast. This is a unique operation because the bank is drilled with



Plant of the Central Sand and Gravel Co. at Memphis, Tenn., where gravel is cleaned by a novel method

The large traveling crane which handles sand and gravel at the Jahncke yards in New Orleans

well drill holes and shot just as a stone quarry would be. Powder is used in other gravel pits and before the suctions of dredges to loosen the ground, but this is the only operation I know of where powder is systematically used in drill holes. The gravel is not so badly cemented but what it can be dug with a steam shovel without shooting and the cementation breaks up in the washing plant, but it has been shown that blasting is the cheapest way to get the big tonnage required. Other companies which have pits in which the digging is hard might find it profitable to use the same method.

Memphis Sand and Gravel Industry

The Central Sand and Gravel Co. at Memphis, Tenn., seems to be succeeding very well in cleaning gravel with jigs from lignite, trash, and mud balls. There is a little fine lignite left in the sand, but not enough to do any harm, and the gravel is cleaned 100%, or as near that as is possible. I did not see a bit of lignite in any of the cars or bins that I looked into, and the only gravel that was escaping with the lignite was a little that was beaten into some mud balls that were being thrown out.

Tennessee Plants Studying Washing Problems

Unfortunately (for there is always something to take the joy out of life), jigging has been found more expensive than was anticipated. The jigs require careful attention, which must be well paid and given skilled attention, and the consumption of power and water is pretty high. So other methods are being studied to see if the same result cannot be had at a somewhat lower cost. The company put an "Eagle" washer in its Greenville plant, making it longer than it was built originally. It seems to be doing excellent work, but it had not been tested for a long enough time or on very dirty material when I heard about it, so the conclusions were not final. The "Perfect" classifier was being studied at Nashville with a view to giving it a try-out, as this machine is doing excellent work at Nashville, where conditions are much the same. The "Eagle" washer is also meeting with success at Nashville.

Wolf River Doubling Capacity

The only other plant I have seen in Memphis so far is that of the Wolf River Sand Co., which is making changes that will double the plant capacity. The dredge has been rebuilt and a new 12-in. pump and variable speed motor installed. This will pump to a sump on the shore and the excess water allowed to run away over a slat gate that can be raised as the sump is filled. This will carry off the greater part of the clay and loam. The sump will be excavated with a clamshell and stiff-leg derrick and sent to the plant by a conveyor belt. The method of pumping to a sump and running off the water through a slat gate is one that has been successfully used in the Tennessee phosphate fields by the Ruhm Phosphate Co., with the same idea of getting rid of most of the mud in the sump overflow.

The Missouri Portland Cement Co. has changed from pumping through a pipe line to the use of barges to get the sand and gravel from the dredge to the plant and has made improvements in its washing plant.

Memphis did a lot of building last year and the prospects, I am told, are for an increase in building this year. The two plants visited ran as steadily through January and February as they run in the peak of the season.

Southern Division of American Mining Congress Holds Interesting Conference

Developments in States Reviewed—Increased Activity Planned—Tests on New Refractory Mineral Shown

THE Industrial Development Conference of the American Mining Congress (Southern Division) was held in the Peabody hotel, Memphis, Tenn., March 15 to 17. About 300 delegates and guests attended, not all of whom were engaged in mineral industries, as many of them came from Chambers of Commerce and similar organizations. The delegates in many instances were appointed by the governors of the states from which they came.

Dr. Henry Mace Payne, secretary and consulting engineer of the American Mining Congress, was the moving spirit of the meeting and explained why it was a conference rather than a convention. It was not a meeting of scientific and technical men or leaders in the mineral industry alone, but of men who were interested in seeing the mineral industries of the South develop and who wanted to prevent the passage of laws, by Congress and the various state legislatures which would prevent or retard such development, and to encourage legislation that would favor such development.

In addition to papers and addresses there was a brief survey of mineral resources of each of the thirteen states represented and the addresses given and the papers read were by men who were in the main known nationally as industrial leaders, educators or technical men.

The results of the conference may be summarized something as follows:

It was voted to raise $25,000, apportioned among the 13 states represented, in sums from $500 to $4,000, for the publication of data concerning the undeveloped resources of the South. The results of Dr. Payne's exhaustive study of these resources, which has recently been completed, is presumably included in this. Resolutions were adopted covering the following: (1) Approving bills before Congress for the exploration and mapping of potash deposits, now known to be very extensive. (2) Indorsing a program for eradicating malaria. (3) Disapproving government engaging in private business (a resolution specifically mentioning state cement plants was killed in the committee, which did not care to particularize). (4) Approving the operation of Muscle Shoals, first for national defense, second for fertilizer and third for general power use. (5) Commending the work of Dr. Payne and Richard H. Edmunds in behalf of Southern mining industries.

Review of Mineral Industries by States

The first session was largely given to a review of the mineral industries and possibilities of each state which sent delegates. These follow:

Virginia. (By Wilbur Nelson, state geologist.) Mr. Nelson gave the greater part of his time to water power resources of the state and illustrated it with excellent maps and charts. He referred to the coal fields and also to the fact that the greatest deposit of gypsum in the country was in the southwestern part.

West Virginia. (Paper by David B. Reager, state geologist, read by Dr. Payne.) The paper gave especial attention to the limestones of the state which outcrop for 500 miles. In some places they are 3000 ft. thick, in others 300 to 350 ft. thick. The latter are good for chemical lime and the

former for crushed stone and cement making. He thought the product of six new cement mills in West Virginia would be able to find a market. Coal amounting to 125,000,000 tons was mined in the state from 1413 mines. The state has a well organized geological department that will gladly furnish information regarding resources.

North Carolina. (By Jefferson Penn, banker of Reidsville, N. C.) The review was largely given to history of the mining of kaolin, mica, feldspar and talc, which was early undertaken, allowed to lapse and then taken up about 10 years ago, so that now 70 industries in the state extract these minerals. There are large reserves undeveloped.

South Carolina. (By E. L. Hertzog, mining operator.) South Carolina used to be a large producer of phosphate rock, iron ore, kaolin and barytes, but now finds it cheaper to import these minerals from other states. The state imports large quantities of cement and hydrated lime and has the necessary raw materials so that it should prove a good field for the manufacture of these. Tin deposits await development.

Georgia. (By J. M. Mallory, industrial agent of C. of G. R. R.) Georgia, one of the best mineralized states has a long list of developed and undeveloped resources. The state geological department needs money to make a proper survey of these.

Florida. (By Stuart Mossom, assistant state geologist.) The largest mineral production is of phosphate rock, which is now at the highest rate of production yet reached. Total phosphate rock produced is 49,000,000 tons; estimated reserves of commercial value are 294,000,000 tons. Florida has produced about two-thirds of all the domestic fullers earth. The state used 3,750,000 bbls. domestic portland cement last year, and about 1,500,000 bbl. of imported cement, but two new mills are being built which should supply the state's needs in full. Aggregate is badly needed for concrete work. The Ocala limestone which is very pure, up to 99.6% $CaCO_3$, is abundant and about 30,000 tons per day are used for road bases. This ought to be the basis of a chemical lime industry. Only 30% of the lime used in Florida is burned in the state. Gypsite has recently been discovered and also bog iron ore. Peat is abundant and is mined for its nitrogen content. The state has a good market for mineral products to be made from its undeveloped resources.

Kentucky. No report was presented.

Tennessee. (By Hugh D. Miser, state geologist.) The most valuable resource in the state is its water power. Mineral products produced in 1924 were valued at $37,000,000. The state is the larger producer of feldspar, is second in phosphate rock, stands high in the production of cement and lime, and is the third largest producer of bauxite and barytes. It is a heavy producer of aggregates, largely used in road work. There is a long list of metallic and non-metallic mineral resources.

Alabama. (By James L. Davidson, secretary Alabama Mining Institute.) Alabama is first among the states represented in the conference in ferrous minerals and building materials, and has a high place in cement production. It produces asbestos, bauxite and barytes on a commercial scale and has the largest plants in the country for producing crushed slag.

Mississippi. (By L. J. Folse, state board of development.) The state is a large producer of clays and sand and gravel and it also produces bauxite, tripoli, phosphate rock and bentonite. The bentonite deposits would de-ink the newspapers printed for many years. It is a great market for lime on account of its paper making industry.

Arkansas. (By J. H. Hand, White River Chamber of Commerce.) The report gave little definite information but it referred the conference to the splendid exhibit of Arkansas minerals in the lobby.

Louisiana. (By Dr. W. R. Irons, department of conservation.) Louisiana has the largest natural gas field. Sand, gravel and shells are produced abundantly. Glass sand is produced for local use. There are large deposits of shells which are to be used for making lime and cement, and there is one good limestone deposit.

Texas. Dr. Payne gave a brief talk on the possibilities of making sponge iron from Texas ore. He was followed by Dr. J. A. Udden, state geologist, who spoke especially of the work on potash deposits. It appears the state contains deposits far exceeding the German deposits in extent and at about the same depth. He wanted these proven by further drilling. The important cement, lime and gypsum industries were not mentioned.

A New Refractory Mineral

The discovery of a new refractory mineral was announced and tests with the acetylene torch were made at the conference. It was shown in the exhibit of the Southern Railway Co. and it is called "baukite." It is not mentioned in Dana's book, even of the latest editions. It appears to be an impure sandstone and the analysis and report of tests which follow are from the railway magazine, *The Southern Field*, issue No. 9:

"There has recently been developed at a location on Southern Railway, near Apison, Tenn., what promises to be the most efficient refractory material thus far found anywhere in the United States. On account of its physical and chemical resemblance to an Austrian refractory, known as "Baukite," it has been named "Baukite" and is now being produced by the American Baukite Company, Apison, Tenn. An analysis follows:

	Per cent
SiO_2	95.84
Al_2O_3	1.51
TiO_2	1.33
Fe_2O_3	.71
CaO	.15
MgO	.40
CO_2	.06
	100.00

"In tests made by the Pittsburgh Testing Laboratories, a brick made up of 50% Baukite and 50% common No. 2 fire clay, successfully withstood a temperature of 3146 deg. F. On a standard reheating test of five hours' duration at 2552 deg. F., the specimen showed a contraction of 2.14%. In the spalling test, the specimen withstood two immersions in water after heating to 2462 deg. F. In a practical test made by a large brick company, using 50% Baukite and 50% high-grade fire clay, the specimen is reported to have withstood over 4000 deg. F.

"For repairing old furnace linings and coating new work, Baukite has a distinct advantage in that it can be applied with a cement gun and the heat turned on while it is still moist. This is due to the fact that it has practically no expansion or contraction in drying."

Baukite has been successfully used as lime kiln lining, in fact its properties were discovered by its being used like ordinary sandstone as lining for a kiln near Knoxville, Tenn. It is thought to be very suitable for lining cement kilns."

Financing New Industries

Dr. Walter Lichtenstein, executive secretary of the First National Bank of Chicago, gave an excellent paper on the financing of new industries. He began with a historical survey of association of capital and explained the theory of limited liability companies. It surprised at least one hearer to know that California has now a law under which such companies may be incorporated. Then he explained the methods by which money should be raised for different purposes. The issue of bonds should only be to refund a floating debt and small companies should not try to issue them as the expense of underwriting and selling such bonds brings the interest charge too high. If money was wanted for extension of plant and operation the proper way of raising it would be by the sale of capital stock. For ordinary purposes, such as the carrying of accounts and pay rolls, ordinary loans secured in some way were to be made. He believed it better to find capital for new construction and the like from the sales of stock rather than taking it from earnings.

In concluding he pointed out that it was no disgrace for any section of the country to seek capital in an older and more developed section. It was rather a sign of growth, since only the growing and developing sections have use for all their capital and more.

Electric Power

There were two excellent papers on power in industry, one by B. E. Eaton, president of the Mississippi Power Co., and the other by M. H. Aylesworth, managing director of the National Electric Light Association. Mr. Eaton pointed out the necessity of sources of power for the development of a state or a section and to illustrate his point he compared Mississippi and Alabama. Mississippi

the most undeveloped state in the south, has been practically without fuel or water power (although discoveries of oil and gas have more recently been made.) Hence the state has been backward in developing its mineral resources. Alabama, on the other hand, had an abundance of fuel, beside water power, and it has developed rapidly and to a great extent.

Mr. Aylesworth gave some interesting facts concerning the cost of producing and distributing power which has constantly decreased so that power is cheaper now than in 1913. In 1920 it required on an average 3.2 lb. of coal to produce a kilowatt hour, but in 1925 the coal required had dropped to 2.1 lb.

He gave some interesting facts concerning the effect of interconnecting power lines, a practice which is going on all over the United States. Recently power was transferred—not transmitted but relayed from one station to another—a distance of 900 miles, from Western Tennessee to Eastern North Carolina to relieve conditions in a section where a drouth had lowered the water power that could be produced. Interconnection of lines could not do much toward lowering the cost of power to the consumer. The actual cost of producing electricity is only about one-fifth of what the consumer must pay; the greater part of the cost being that of distribution. The making of power by burning coal at the mine was not practical in many places as four tons of water were required for each ton of coal burned.

A "Severance" Tax on Minerals

George Vaughn, president of the National Tax Association, discussed the "severance" or separation tax on minerals, forest products and the like, which many states have in one form or another. In Louisiana it grew from a licensing system, first to protect game and then to protect forests and oil reserves. It was finally made into a percentage tax on the value of minerals and forest products removed which paid $10,000,000 yearly to the state, all going to educational purposes. It was fair because it was an "in lieu" tax, the ground bearing oil, for example, being taxed only at the farm land rate with nothing added because of its oil contents. But the disposition of legislatures was to make a "severance" tax a super-tax, adding it on to taxes as assessed valuation. The typical example was the Pennsylvania anthracite tax of 1½% on the value of the coal removed in addition to all other taxes collected.

In discussing this tax, J. C. Callbreath, national secretary of the American Mining Congress, showed that the mineral industries were more highly taxed than any other. He called attention to an article in the current number of the *Mining Congress Journal*, published by the American Mining Congress, in which the figures were analyzed.

United States Potash Resources

Frank L. Hess, chief mineral technologist of the U. S. Bureau of Mines, gave an excellent paper on the potash resources of the United States. He first described the Stassfurth and Alsatian deposits in Germany so that his hearers might be able to make comparisons. There are over two billion tons in the Stassfurth reserves, of 11% recoverable potash, in 500 ft. thick beds which are mined by shafts from 1200 to 3500 ft. deep. He also spoke of the deposits in Spain, Poland and Abyssinia which are little known.

In the United States we have the "green sands" of New Jersey and the brines of western arid regions and alunite and other minerals from which potash may be extracted with difficulty. The German and French syndicates understanding the situation cause us to pay about $39,000,000 per year more than we should pay on a basis of the cost of producing the potash we use.

Fairly recent discoveries, made by drilling wells in Texas and New Mexico, have shown that an area 650 miles long and 150 miles wide contains potash beds averaging 400 ft. in thickness. Most of it is rather low grade stuff but near Carlsbad, N. M., there is 437 ft. which averages 9% recoverable potash lying only 156 ft. below the surface. This compares fairly well with the Stassfurth deposit. Near Pratt, Kansas, in Utah and at some points in Texas fairly rich beds have been discovered.

The German producers have important advantages in the way of cheap labor, cheap power and cheap transportation (by canal and river to the sea.) In Dr. Hess' opinion it would be unprofitable to work the American potash beds in competition, but it would be profitable to prospect them by drilling and to do enough so that the foreign producers could take their choice between selling us potash at a fairer price or seeing their potash shut out and American potash mined and marketed. Bills before both the House and the Senate would authorize such exploratory work to be done and he thought the Mining Congress should support them.

A Protective Tariff on Minerals

This was discussed in a paper by Richard H. Edmonds, editor of the *Manufacturers Record*, read by Dr. Payne. In this paper and the discussion it was brought out that anything upon which work had been done was no longer a "raw material," but a finished product so far as the producer was concerned. Hence mineral products, as well as manufactured articles, were entitled to protection.

Electric Smelting of Phosphate Rock

James A. Barr, well known to Rock Products readers for his articles on the phosphate rock industry, spoke briefly on the reduction of phosphate rock by electric furnace methods making some comparisons between this method and the ordinary wet method. He also touched upon the new heat methods which are still in the experimental stage. Among the heat processes that promised much was that of the pyro-electric furnace which used a flame from powdered coal superimposed upon an electric arc.

Miscellaneous Addresses

There were a number of excellent addresses which are not abstracted here, only those of interest to the rock products industry being selected. Full reports of the proceedings of the Conference are to be published soon. A paper which would have been of especial interest was one on the standardization of the non-metallic mineral products, by Raymond B. Ladoo, consulting engineer of New York. It was read only by title. Important addresses in a general way were those given by L. W. Baldwin, president of the Missouri Pacific Railway on the importance of railroads to mining, and one on waterways by H. W. Scaman, member of the advisory board of the Inland Waterways Corporation of the United States, who spoke at the banquet.

The following were chosen as a board of governors for the southern division of the American Mining Congress: J. G. Bradley, Dundon, W. Va.; Charles W. Johnston, Portsmouth, Va.; Dr. A. D. Creaves, Walker, N. C.; E. L. Hertzog, Spartanburg, S. C.; J. M. Mallory, Savannah, Ga.; C. G. Memminger, Asheville, Fla.; James L. Davidson, Birmingham, Ala.; W. H. Smith, Laurel, Miss.; I. N. Day, Dawson Springs, Ky.; Howard I. Young, Mascot, Tenn.; H. B. Flowers, New Orleans, La.; C. J. Griffith, Little Rock, Ark.; S. J. Ballinger, San Antonio, Texas; and Prof. E. E. Tourtelette, Wilburton, Okla.

The American Mining Congress has been functioning for about 30 years. Originally it was a western organization, but its activities have been more in the east and south in later years.

Exhibits of Southern Minerals

The exhibits showing the mineral resources of various parts of the south were almost enough in themselves to justify a visit to the conference. Possibly the largest and most complete was that of the Southern Railway system which included specimens from almost all the states represented. The Central of Georgia railroad had another collection of the same sort. Of the states represented, two made exhibits, Mississippi and Arkansas. The Mississippi exhibit was somewhat of a surprise to those unfamiliar with Mississippi resources. There were specimens ranging from petroleum to limestone with such other commercial minerals as bauxite and phosphate rock. The Arkansas exhibit was large and fairly illustrative of the varied resources of the state. It was made by E. B. Bird, who owned much of the land from which the specimens came. The St. Joe Lime and Stone Co., an Arkansas company, had a good exhibit of its own products. These included lime, stone, bauxite, and zinc ore. It was in charge of J. L. Wilson, president of the company.

New England Sand and Gravel Operation

Riverside Sand and Gravel Co., Newton Lower Falls, Mass., Has Unusual Guyed Derrick and Clamshell System of Excavation

By Charles A. Breskin

ONE of the things that differentiate the Riverside Sand and Gravel Co. from other plants in the country is the scale upon which guyed derricks are used for excavating the material and the success the company has had with this type of equipment. Despite the fact that it employs one of the largest derricks in New England, the scheme of operation is very flexible and a large tonnage is obtained.

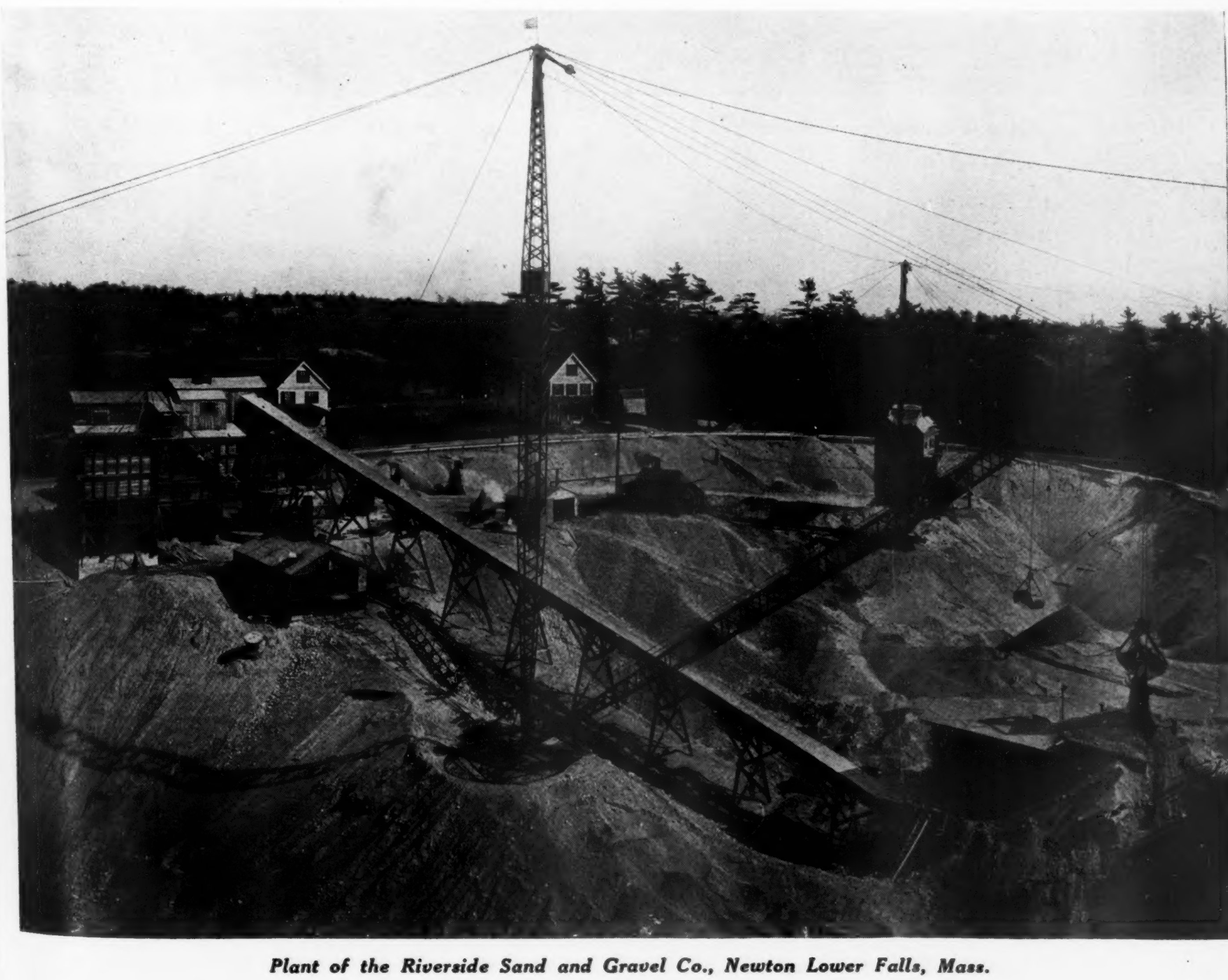
The plant is located 13 miles southwest of Boston in a suburb known as Newton Lower Falls. Its shipments are entirely by motor truck and to the community immediately surrounding it. A ten-mile radius is figured as economical for truck shipment.

The deposit is a fluvio-glacial deposit composed of glacial materials which have been brought to the present location by water. It is 13 acres in extent and the deposit runs to a depth of 125 ft. It is remarkably free from dirt or other foreign materials and therefore does not require washing.

The company operates two plants, each of which is served by a guyed derrick and clamshell bucket. In addition, a dragline scraper bucket is employed to bring the material within range of one of the derricks.

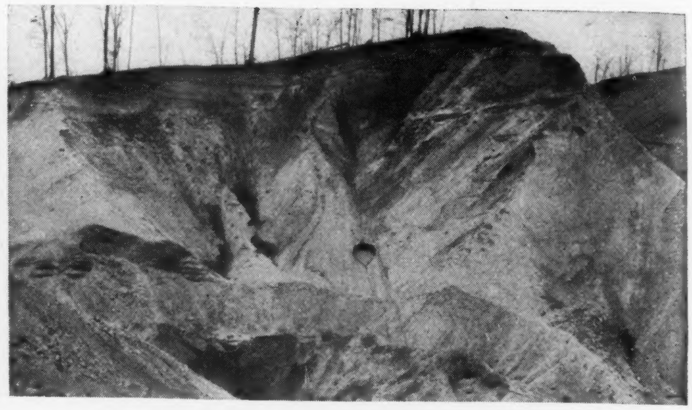
The main plant is served by an Insley steel derrick, with a 115-ft. boom and a 2-yd. Blaw-Knox clamshell bucket. The derrick is operated by a 10x13in. steam-driven three-drum Mundy hoist. This arrangement enables the handling of 1000 tons of sand and gravel in 9 hours, the bucket taking over 2 yd. in a bite. A round trip of the derrick is made in 45 seconds. The entire unit is flexible, as the hoist can be moved to a new location under its own power, when the derrick has reached its limit of operations. The derrick is built up in sections and can also be moved to a new location with comparative ease.

The clamshell bucket discharges into a hopper, underneath which is a pulsating feeder, which carries the material to a 4x12-ft. scalping screen, with 2-in. perforations. The material under 2 in. falls on a

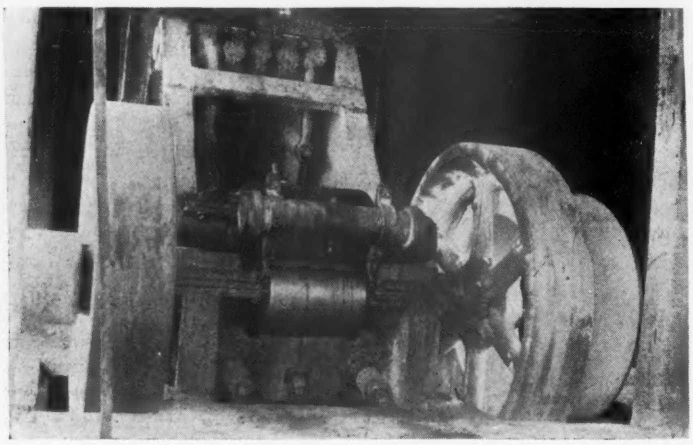


Plant of the Riverside Sand and Gravel Co., Newton Lower Falls, Mass.

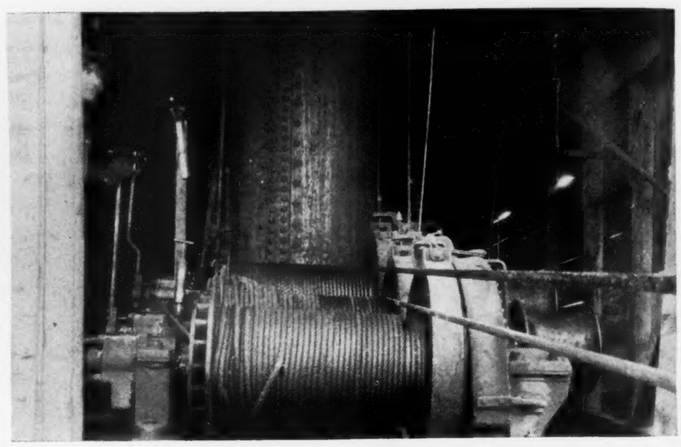
The 1 1/4-yd. clamshell bucket serving the second plant



Dragline scraper used to bring material within range of second derrick

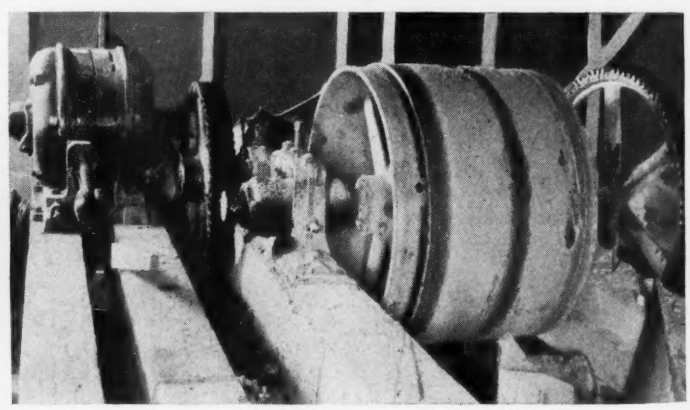


Jaw crusher taking oversize from scalping screen

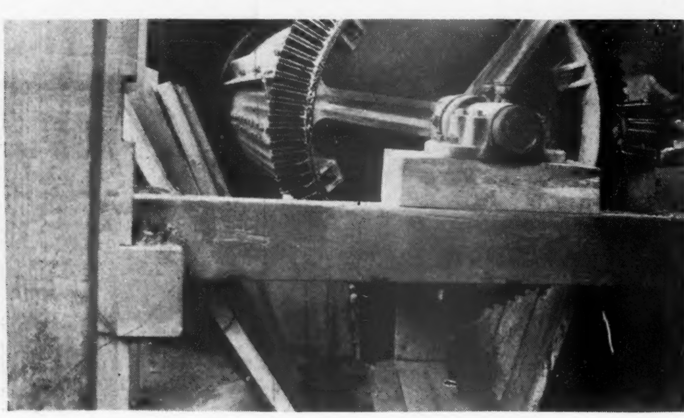


Three-drum hoist used to operate 1 1/4-yd. derrick rig

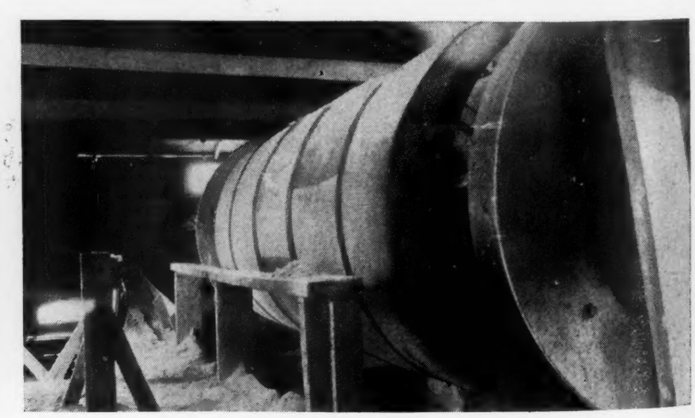
Main conveyor belt, 20-in. by 500-ft. centers. Note nipples on idler pulleys for grease gun lubrication



Conveyor head pulley and drive. All bearings are equipped with roller-bearings



Main scalping screen



Rotary sizing screen which makes four separations

belt conveyor, 20 in. wide with 500-ft. centers, and is carried to the main screening plant. The material over 2 in. is discharged to a 20x24-in. New England Road Machinery Co. jaw crusher. The discharge from the crusher is spouted back to the main conveyor. The main belt was furnished by the Boston Woven Hose and Belting Co.

At the screening plant, the belt conveyor discharges direct to a 48-in. by 30-ft. rotary screen. Here separations are made into sizes 3/16-in. and down, ¼ in., ¾ in., and 1½ in. The material 2 in. and over is discharged to a small belt conveyor, which feeds a No. 4 Champion jaw crusher. The discharge from here falls direct to bins below. The entire unit has a capacity of 100 yd. per hour and the total storage capacity is 1300 yd.

It is interesting to note that all screen trunnions and conveyor pulleys are fitted with roller bearings.

The second plant is served by a Dobie wood derrick, with a 90-ft. boom and a 1¼-yd. Blaw-Knox clamshell bucket. This rig is operated by an 8¼x10-in. steam-driven three-drum Mundy hoist. The derrick arrangement here is stationary and a 2-yd. Sauerman scraper bucket is used to bring the material within the range of its operation. The bucket is operated by an 8¼x10-in. two-drum skeleton Mundy steam hoist.

The 1¼-yd. bucket discharges to a hopper located on top of the plant. This is fitted with grates and a feeder which discharges to a 3½x18-ft. rotary screen. Four separations are made here, 3/16, ¼, ¾, and 2 in. The capacity of this unit is 50 yd. per hour and the bin storage capacity 140 yd.

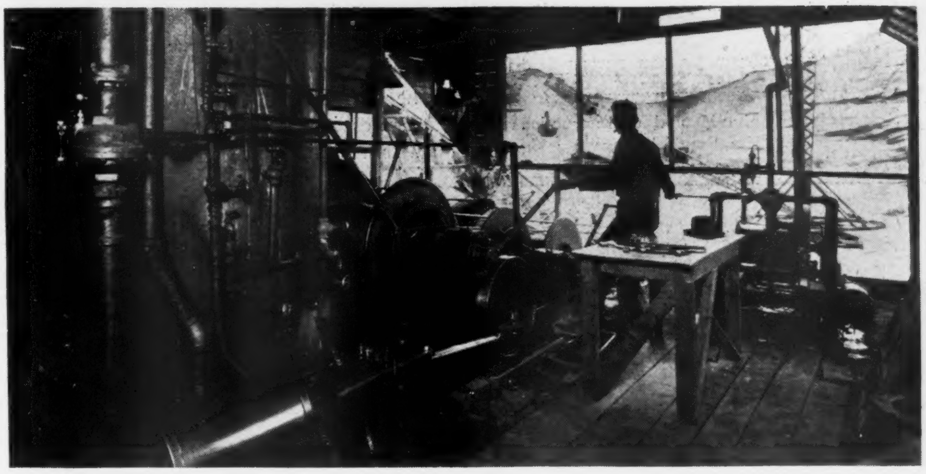
A large ground storage is also utilized, three wagon loaders being used to load from stock pile into trucks. When unusually busy, a crane is put on the job.

The company standardizes throughout on Roebling wire rope for hoist and derrick operation, ¾- and ⅞-in. sizes being used. All conveyor idlers and the hoists are fitted with the "Dot" system of lubrication.

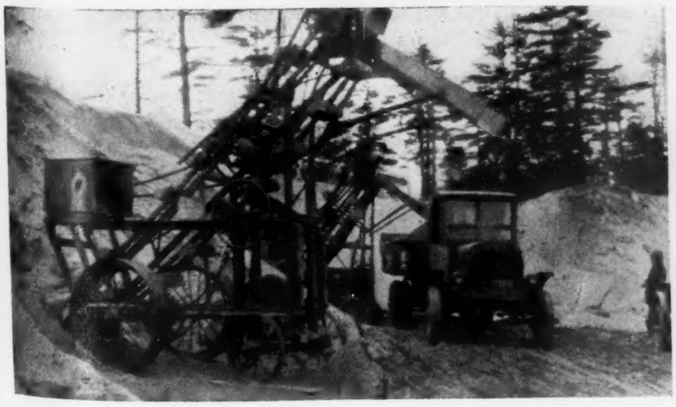
The company owns and operates a fleet of thirteen 5-ton trucks, of which ten are Macks, two American La France, and one Sterling.

The president of the Riverside Sand and Gravel Co. is Amato Pescosolido; treasurer, Louis Vassalotti; chief engineer, E. J. De Lorenzo, and Wm. F. Bent, assistant manager.

Boom and 2-yd. clamshell bucket of main derrick



Control room—the three-drum hoist operates the 2-yd. derrick, and the small hoist in the foreground is for the bull wheel



Portable loaders used for loading from ground storage

One of the thirteen 5-ton trucks used for delivery

Combining Concrete Aggregates*

Methods by Which Fine and Coarse Aggregates May Be Mixed to Produce Required Fineness Modulus and the Quantity Necessary for Different Classes of Concrete

THE method of combining aggregates will be illustrated by an example. The following is a practical field problem involving Class "A" concrete (see last table) for use in structures.

Illustration 1

Two Aggregates. Deposit a bucket of sand upon a smooth level surface, mix thoroughly and quarter. From one of the quarters dry an amount which will allow the weighing of 500 grams of the dry sand. Wash this through several waters until no further discoloring of the water occurs. Dry and reweigh. The loss in weight divided by the original weight is the percentage of wash.

Next, make the sieve analysis. It will be assumed for the problem that the curve plotted on Chart No. 1 indicates the following:

Approximate percentages retained on Tyler Standard sieves:

100 mesh	97%
48 mesh	93%
28 mesh	66%
14 mesh	41%
8 mesh	22%
4 mesh	10%
3/8 inch	0%
Total	329%

*Reprinted from the Manual of Instructions of the Bridge Department of the California Highway Commission.

The sum of these percentages (329) divided by 100 gives 3.29, which is the fineness modulus of the sand. (See bulletin No. 1, "Design of Concrete Materials," by Duff A. Abrams, professor in charge of Structural Materials Research Laboratory, Lewis Institute, Chicago.)

For the purpose of the problem it will be assumed that the coarse aggregate curve plotted on Chart No. 1 indicates the following approximate percentages retained on the Tyler standard sieves:

100 mesh	100%	
48 mesh	100%	
28 mesh	100%	
14 mesh	100%	
8 mesh	98%	Fineness modulus 6.93
4 mesh	94%	
3/8 inch	68%	
3/4 inch	33%	
1½ inch	0%	
3 inch	0%	
Total	693%	

The fineness moduli of both the fine and the coarse aggregate have thus been determined. The next step is to assume a fineness modulus for the combined aggregate and then to compute the percentages of the fine and of the coarse aggregate to be used to give the assumed modulus.

The combined modulus for two or more aggregates is the weighted average of the fineness moduli of the separate materials. In other words, multiply each modulus by the percentage of that material to be used, add the products and divide by 100.

For the class of concrete assumed for this problem, experience shows that the combined fineness modulus of sand and gravel should be about 5.60. With this and the fineness moduli above found, the proportions of aggregates may be determined. (Reference is made to Chart No. 2 which is a reprint from page 19 of Professor Abrams' Bulletin No. 1 noted above.)

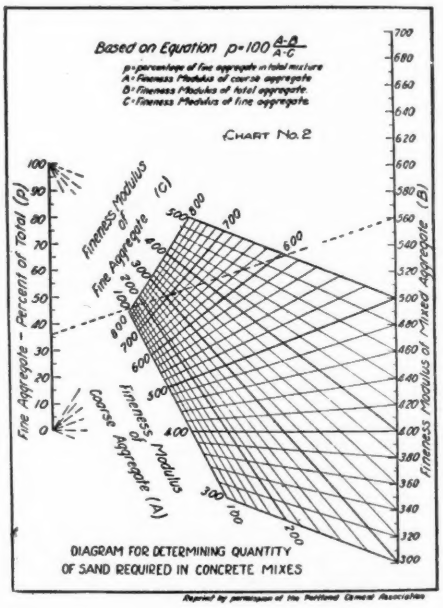


Chart No. 2. Diagram for determining quantity of sand required in concrete mixes

$$P = 100 \times \frac{693 - 5.60}{693 - 3.29} = 36\frac{1}{2}\%$$

It is found that the fine aggregate should be 36½% of the total aggregate.

The specifications call for the use of 6 sacks of cement to each cubic yard of Class "A" concrete.

Experience shows that approximately 5.4 cu. ft. of the dry aggregates (measured separately) are required with each sack of cement to produce this result. This figure should be used at the start of new work and later slightly modified to produce exact results.

The sand required is 36½% of 5.4 or 1.97 cu. ft. measured dry. Assuming that "bulking" is found to be 25%, the amount of sand as taken from the stockpile will be 1.97 increased by 25%, giving 2.46 cu. ft.

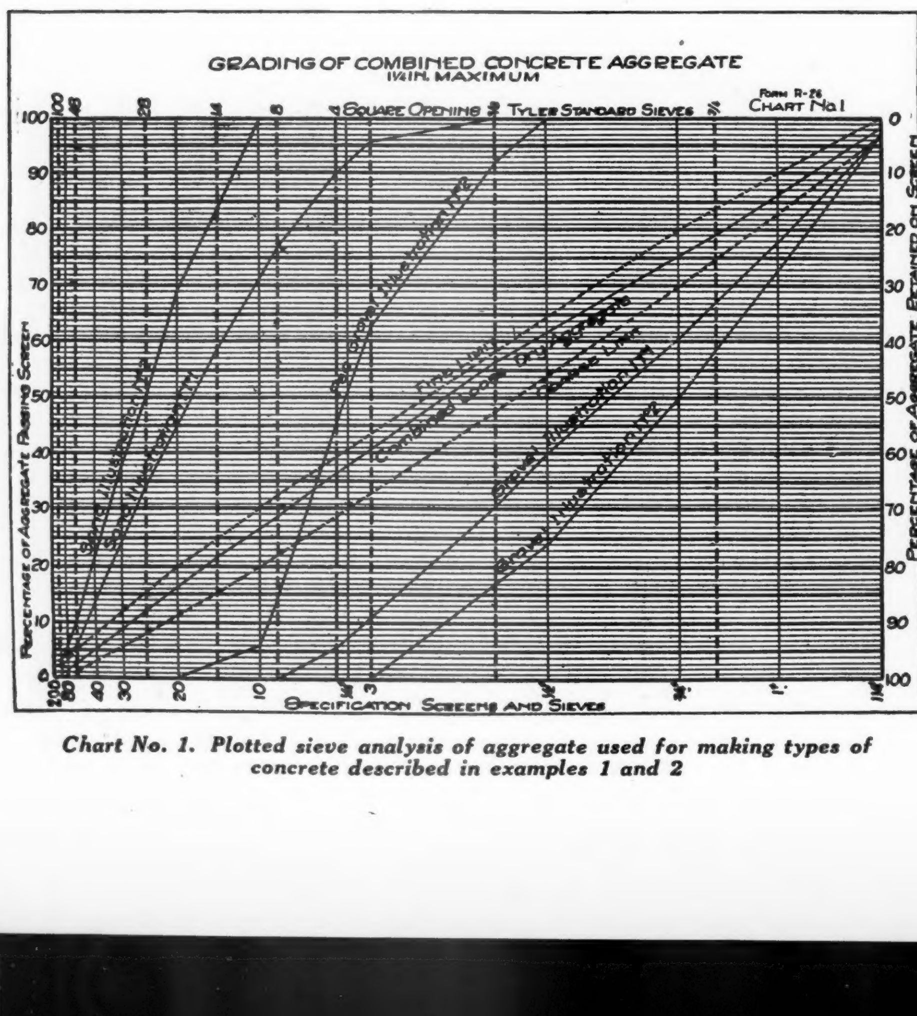


Chart No. 1. Plotted sieve analysis of aggregate used for making types of concrete described in examples 1 and 2

When the fine aggregate is proportioned by weight it is necessary to check the percentage of moisture in order to make the weight corrections. It is not necessary to determine the bulking when proportioning by this method.

The amount of gravel to be used will be 63½% of 5.4 or 3.43 cu. ft.

Assuming that these quantities are found to produce concrete having only 5.8 sacks of cement instead of the specified 6 sacks, a correction of 0.2/6 = 3 1/3% is necessary. In the next placing from the same materials, the amounts of sand and gravel used per sack of cement should be reduced by 3 1/3% and the result again noted.

Having determined the proper proportion of each dry ingredient to be used, it now becomes necessary to assume the number of cubic feet of the total dry aggregate to be mixed with each sack of cement in order to use six sacks of cement per cubic yard of concrete. For a start assume 5.5 cu. ft. of dry aggregate measured separately. Also assume that the proportions determined upon were 25% sand, 25% pea gravel and 50% gravel. This will conform to the combination as previously illustrated, giving a fineness modulus of 5.60. The amount of dry sand will be 25% of 5.5 cu. ft. or 1.375 cu. ft.; of dry pea gravel 1.375 cu. ft. and of gravel 2.75 cu. ft.

SPECIFICATIONS FOR COMBINED AGGREGATES (Requirements prior to June, 1925)

	2½-in. maximum	1¼-in. maximum
Passing a 2½-in. circular opening	93 to 100%	
Passing a 2-in. circular opening	85 to 90%	
Passing a 1¼-in. circular opening	67 to 80%	97 to 100%
Passing a ¾-in. circular opening	53 to 67%	70 to 80%
Passing a No. 3 Standard Sieve (0.263)	30 to 40%	33 to 43%
Passing a No. 10 Standard Sieve	18 to 27%	20 to 30%
Passing a No. 20 Standard Sieve	10 to 18%	11 to 20%
Passing a No. 30 Standard Sieve	5 to 12%	6 to 12%
Passing a No. 40 Standard Sieve	3 to 8%	3 to 8%
Passing a No. 80 Standard Sieve	0 to 4%	0 to 4%
Passing a No. 200 Standard Sieve	0 to 1%	0 to 1%

It sometimes happens that upon making the sieve analysis of materials, gradings are found that cannot be combined to meet the specifications. This situation can usually be remedied by the proper use of a third aggregate, such as pea gravel. When pea gravel is used the combination of the various materials should be made in the concrete mixer and in the proper proportion to produce the gradings required by the specifications for combined aggregates.

On chart No. 1, the fine and coarse limits of the specifications for combined aggregates are shown in dotted lines. An ideal mix will follow very closely the mean between these lines.

Illustration 2

Three Aggregates. The problem here is first to plot a curve representing each material and then to so proportion the amount of each as to make the combined curve fall within the limits of the specifications and give a fineness modulus of at least 5.60.

The following sieve analyses of materials passing each screen is assumed (Table I).

TABLE I—SIEVE ANALYSIS OF MATERIALS

Sand		Pea Gravel		Gravel	
Wash	1.6%	No. 20	0%	No. 3	0%
No. 50	10%	No. 10	6%	½-in.	24%
No. 30	38%	No. 3	63%	¾-in.	51%
No. 20	69%	½-in.	100%	1¼-in.	92.5%
No. 10	100%				

It will be seen that the sand and gravel cannot be combined in such a manner as to comply with the specifications. To determine the proportion of each aggregate to be used in order to comply with the grading requirements of the speilcations it is well to try and follow closely the mean line on Chart No. 1. Determine by trial on the chart what proportions of each aggregate it is necessary to use to give a combined aggregate closely approximating the mean line.

It will be assumed that bulking of the sand is 27% and that bulking of the pea gravel is 15%. Applying bulking corrections as explained above it is found necessary to use 1.75 cu. ft. of sand, 1.58 cu. ft. of pea gravel and 2.75 cu. ft. of gravel, each measured separately as it comes from the stockpiles. This combination should yield a cubic yard of concrete in place for each six sacks of cement used. If it does not, the necessary corrections should be made as explained above.

In June, 1925, a revision of the specifications was made to agree with standardized screen equipment, adopted by a large number of material producers. In order to overcome separation of sizes two divisions of the coarse aggregate are required.

Revised specifications for combined aggregates are shown in Table II.

To show the combination of the aggregates for reinforced concrete in structures using class "A," 1½-in. maximum aggregate an illustration will be given.

Illustration 3.—The grading of the assumed aggregates to be used passing specification screens are shown in Table III.

These aggregates are plotted on Chart No. 3. To determine the proportions of each aggregate to be used, in order to comply with the grading requirements of the specifications, it is best to follow closely the mean line on Chart No. 3. Determine by trial what proportions of each aggregate it is necessary to use in order that the combination will fall within the specifications limits, and give a fineness modulus of 5.80. The proportions will be assumed as 38% sand, 30% pea gravel, and 32% gravel. This combination falls along the mean line of the specification grading, and the combined grading as taken from the chart on the Tyler screens is:

100 mesh	99%	
48 mesh	97%	
28 mesh	88.5%	
14 mesh	80%	
8 mesh	73%	Fineness modulus 5.80
4 mesh	66%	
⅜-inch	50%	
¾-inch	26.5%	
Total	580%	

Having determined the proper proportion of each dry loose aggregate to be used, it is necessary to assume the number of cubic feet of the total dry loose aggregates to be used, so that the desired quantity of cement, which is six sacks per cubic yard of concrete, will be used. As hereinbefore given, 5.5 cu. ft. of dry loose aggregate measured separately will be assumed.

The quantity of dry aggregate to be used per sack of cement is:

38% of 5.5 cu. ft. or 2.09 cu. ft. of dry loose sand
30% of 5.5 cu. ft. or 1.65 cu. ft. of dry loose pea gravel
32% of 5.5 cu. ft. or 1.76 cu. ft. of dry loose gravel

It will be assumed, that the bulking due to moisture is 20% for the sand, and nothing for the pea gravel and gravel. Applying the bulking correction, the proportions to be taken from the stock piles should be:

2.5 cu. ft. sand
1.65 cu. ft. pea gravel } per sack of cement.
1.76 cu. ft. gravel

In the above illustration, if class "F" concrete (seven sacks of cement per cubic yard of concrete in place) had been required, it would be necessary to reduce the quantity of aggregate per sack of cement. The same fineness modulus as for class "A" concrete should be used, thus maintaining the same percentage of aggregate, that is 38% sand, 30% pea gravel, and 32% gravel.

The addition of cement requires that the number of cubic feet of dry loose aggregate measured separately be reduced. It will be very close to assume 5.0 cu. ft. of the dry loose aggregate measured separately. This will give:

38% of 5.0 cu. ft. or 1.9 cu. ft. of dry loose sand
30% of 5.0 cu. ft. or 1.5 cu. ft. of dry loose pea gravel
32% of 5.0 cu. ft. or 1.6 cu. ft. of dry loose gravel

Applying the 20% bulking correction for

TABLE II—REVISED SPECIFICATIONS FOR COMBINED AGGREGATES

	2½-in. maximum	1½-in. maximum
Passing a 2½-in. circular opening	93 to 100%	
Passing a 2-in. circular opening	83 to 90%	
Passing a 1½-in. circular opening	72 to 83%	100%
Passing a ¾-in. circular opening	53 to 67%	65 to 75%
Passing a No. 3 Standard Sieve	30 to 40%	33 to 43%
Passing a No. 10 Standard Sieve	18 to 27%	20 to 30%
Passing a No. 20 Standard Sieve	10 to 18%	11 to 20%
Passing a No. 30 Standard Sieve	5 to 12%	6 to 12%
Passing a No. 40 Standard Sieve	3 to 8%	3 to 8%
Passing a No. 80 Standard Sieve	0 to 4%	0 to 4%
Passing a No. 200 Standard Sieve	0 to 1%	0 to 1%

TABLE III—ASSUMED GRADING OF AGGREGATES

Fine Aggregate Sand		Coarse Aggregate No. 1 pea gravel		Coarse Aggregate No. 2 gravel	
No. 3	95%	¾-in.	100%	1½-in.	100%
No. 10	66%	½-in.	57%	1¼-in.	69%
No. 20	40%	No. 3	7%	¾-in.	6%
No. 30	24%	No. 10	0%	½-in.	0%
No. 40	14%				
No. 80	2%				

the sand, the aggregate to be taken from the stockpile would be:

2.28 cu. ft. sand
1.5 cu. ft. pea gravel } per sack of cement.
1.6 cu. ft. gravel

The various classes of concrete used by the Bridge Department are:

Class F concrete	1½-in. aggregate
Class F concrete	1¼-in. aggregate
Class A concrete	1½-in. aggregate
Class A concrete	1¼-in. aggregate
Class A concrete	2½-in. aggregate
Class B concrete	2½-in. aggregate
Class C concrete	2½-in. aggregate

Table IV gives approximately the dry loose quantity of fine and coarse aggregate measured separately, also the combined fineness modulus and the amount of water that should be used per sack of cement for the above classes of concrete. For three aggregates the quantities in the fourth column would be slightly increased (approximately 2%).

The quantity of mixing water is of great importance since the strength of concrete is determined by the ratio of the volume of mixing water to the volume of cement.

The grading requirements of the specifications are such that if the combined aggregates fall within the specified limits and if the combined fineness modulus as given above is obtained a workable mix can be had with a minimum volume of water, thus producing a maximum strength for a given quantity of cement.

If there is a large percentage of crushed aggregate in the combined mix it may be necessary to reduce the combined fineness modulus slightly from the value given in the table.

A safe rule to follow in designing concrete mixtures is to use the least possible amount of fine aggregate and water that will produce a workable mix, considering the required workability for the section of structure in which the concrete is to be placed.

TABLE IV—MIXING PROPORTIONS FOR PREPARATION OF VARIOUS CLASSES OF CONCRETE

Class of Concrete	Maximum aggregate	Fineness modulus of combined mix	Approximate cu. ft. of two dry aggregates measured separately per sack of cement	Total gallons of mixing water per sack of cement
Class F	1½-in.	5.80	4.9 cu. ft.	6 to 7
Class F	1¼-in.	5.60	4.9 cu. ft.	6 to 7
Class A	1½-in.	5.80	5.4 cu. ft.	6 to 7
Class A	1¼-in.	5.60	5.4 cu. ft.	6 to 7
Class A	2½-in.	6.20	5.4 cu. ft.	5 to 6¼
Class B	2½-in.	6.10	6.7 cu. ft.	6 to 7
Class C	2½-in.	6.00	8.0 cu. ft.	7 to 8

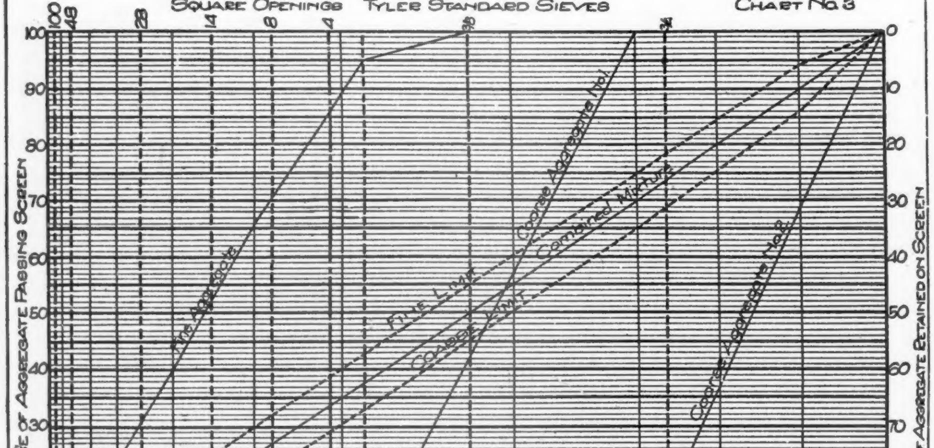


Chart No. 3. Plotted sieve analysis of aggregates used to make type concrete described in example 3

Cinder Aggregate Important Factor in New York City

COAL strike back draughts affecting New York City construction swept through the market recently, says the *Dow Service Building Reports.*

It all came about when certain inquiries were made in the market for ashes for delivery in an out-of-the-way location and none of the regular dealers seemed able or willing to take the order in spite of the fact that the inquirer said he was willing to pay considerably over the $1.25 to $1.75 price range per cubic yard for cleaned and screened hard coal cinders.

Investigation quickly revealed an interesting situation with regard to the condition of supply and demand for cinder ash in this market in which the late hard coal strike, the growing popularity of oil as fuel in big buildings and the influence that the tremendous recent and current building construction movement is having upon this aggregate which, in its way, insures to the dwellers in modern buildings in great cities, security against fire.

Instead of being in a state of decline the ash business in New York City is said to be just starting out upon its career as a merchantable building commodity. While oil burning equipment has grown in public favor, there are still ten buildings designed to use hard coal for heating, and frequently for power, against every one that is being equipped with oil burners for the same purposes, so that the cinder-concrete fireproofing industry need be under no apprehension regarding a future adequate supply of hard coal cinders in New York City.

Cinders, once cleaned and sifted against impurities, are sold to individual contractors for concrete flooring at building sites and for protecting steel columns and girders against fire. They also find an increasing market at isolated cement product plants where they are made up into cinder concrete block and tile and are sold to building owners and contractors as building material units for light construction.

Traffic in cinders has increased in New York City from 2,000,000 cu. yd. in 1914 to 75,000,000 yd. in 1925. This tremendous growth has been ascribed to the more widespread use of larger and more powerful mixing bins.

One of the biggest sources of cinder supply in other years has been the railroad terminals, but with the high cost of other material and the large building and filling programs of their own, this source of supply has been shut off from building.

The hard coal strike did not affect, to an extent sufficient to undermine the cinder concrete industry, the steam size hard coal users until the very fag end of the strike when they began to run short on contract deliveries. Large supply centers had hard coal up to the end, and are now beginning to get more hard steam size coal, so the cinder supply crisis may be said to be passed.

Effect of Grading of Aggregates on Overrun of Concrete

Suggestions for Prevention of Overrun Have Interest to Aggregate Producer

NEARLY every highway contractor loses money—at least in the sense that he does not make as much money as he estimates is coming to him—because the actual amount of material put into a concrete highway pavement almost invariably exceeds the amount estimated in the specifications, and allowed for by engineers in the finished job. Naturally, the prevention of this loss has received much discussion among contractors.

According to a paper by Robert E. O'Connor, of J. C. O'Connor Sons, contractors, Fort Wayne, Ind., presented at the recent convention of the American Road Builders' Association, the universally accepted causes of overrun are: (1) The measurement of the aggregate; (2) the correctness of the subgrade. The first of these causes has a direct bearing on the business of the aggregate producer, and in the end the elimination of this cause will doubtless prove to his advantage.

Under the measurement of aggregates, Mr. O'Connor discusses at length the bulking of moist sand, with which producers are now thoroughly familiar, and which is the best argument possible for the selling and purchase of sand by weight, instead of the cubic yard, or volume. By the same argument the contractor who wishes to conserve cement should proportion his concrete mixture accurately by weight, or by the inundation method.

Effect of Grading of Coarse Aggregate

Another factor in the measurement of aggregates is the grading, and here we quote Mr. O'Connor directly: "Correct measuring of the coarse aggregate as far as actual volume is concerned has been well taken care of. Practically all trouble encountered has been a result of the grading of the material by the producer; or, if delivered correct in all respects by him, through separation of coarse and fines, due to improper handling by the contractor. The variation of grading in coarse aggregate also has its effect on the yield of concrete. If the cement factor is based on a normal grading of coarse aggregate from ¼-in. to 2½-in. in size, and the grading changes so that nearly all the fines or material below ¾-in. is omitted, the reduction in yield of concrete will be approximately 4% (See *Public Roads*, July, 1924, page 23).

"In actual costs this means about one-half of the overrun of materials computed under bulking of sand. Contractors have been lax in their attention to the materials delivered to them for use in concrete, particularly in regard to coarse aggregate. They have not considered the question of choice of kind, nor have they, after purchase, inspected or tested to determine for themselves whether the aggregate they are paying for does come up to the specifications under which it was purchased; neither do they give the attention to the handling of coarse aggregate that is necessary to secure the best results.

"Materials passing the specifications on board cars can be changed into various gradings by handling and storing, and correct materials properly stored can be rehandled in such a way as to almost wipe out the efforts that have gone before.

"This is not the right attitude necessary to prevent overrun. Contractors should insist on everything necessary being done by their organization on a job to correct it.

Tendency to Leave Out Fines

"Coarse aggregate is usually condemned by the engineer for other reasons than for lack of fines. Material producers know that an excessive addition of fines will cause their product to be rejected much more quickly than through lack of them. Therefore, they will play safe along that line, to the cost of prevention of overrun.

"As to the choice between crushed stone and gravel, much has been said as to the results obtainable in their grading under present methods of production; also as to the effect of the use of either on quantity and quality of concrete produced. This also is worthy of investigation.

"As proof of the extent to which fines are lacking, one of our leading eastern state highway departments estimates that 50% of the coarse aggregate for their paving work was deficient in the small size of material, and of course a corresponding loss was suffered in construction."

The foregoing is reason enough for aggregate producers, who are alive to what is going on about them, to study and perfect the grading of their coarse aggregates. The contractor can now be touched on his tenderest spot—his pocket-book—through arguments which can prove to him that the cheapest aggregate is not always the most economical. Also the producer should know the product he is putting out well enough to know whether the material is not properly graded at the plant, or its grading ruined by subsequent handling.

The Future of Railway Construction

Forecast Indicates Big Demands Upon Producers and Manufacturers of Rock Products

UNDER the title "The Future of Railway Construction," W. H. Kirkbride, of the Southern Pacific Co., San Francisco, Calif., made to the Associated General Contractors' convention at Portland, Ore., January 22, 1926, which contains much encouragement for the producers and manufacturers of rock products construction materials, as the following excerpts will prove:

"Successful operation means uninterrupted operation and adequate service. Adequate service means expansion, for as the country grows so must the railroads grow. They cannot stand still, because to stand still means in effect to go backward. Growth and expansion demands construction.

"The foundation of our railroad structure is finished, we might compare it to an office building—foundation and steel work erected, walls enclosed and lower floors actually occupied—the problem before the owners being to decide whether minor additions and improvements can be made, or in other words, the main, branch and laterals of our system are all laid out and the next job will be to fill in by short extensions and to improve the plant for operating existing lines.

Character of Work

"In my judgment the character of future railroad construction will be somewhat as follows:

"There will be a constant improvement in the track structure consisting of more and better grades of ballast, heavier rail sections.

"There will be an orderly replacement of timber structures by structures of steel and concrete.

"Tunnels will be enlarged and lined throughout with concrete to eliminate maintenance expense, and to permit faster operation of trains without hazard of accident and fire.

"There will be line changes of existing main lines to reduce gradients and curves, resulting in more economical operation with faster trains.

"These line changes, combined with track elevation, will also be made to remove trunk lines from the hazard of high water from overflowed rivers. In my own experience there has been considerable of this kind of

work done—the problem will be before the railroad engineer for many years to come.

"There will be an extensive program of siding construction and extensions to handle the long trains made possible by improved motive power, and permit the maintenance of faster train schedules. These sidings will be planned to conform to the ultimate location and construction of second track, as second tracks will be constructed only after the volume of traffic on single main line, with a maximum number of sidings, proves the need of additional trackage.

"There will be the utilization of existing branch lines, more or less parallel to main trunk lines, to serve as second tracks. Such lines, of course, will be reconstructed to conform to main line standards.

"Finally, as traffic increases there will, of course, ultimately follow the construction of second and multiple tracks. Such tracks will first be constructed in and out of terminals, over mountain ranges and where points of congestion and delays occur.

Freight Terminals

"There will be a rather immediate and extensive program of constructing in connection with freight terminals, classification and departure yards.

"Car repair yards with shop facilities will be enlarged and storage tracks added.

"The construction of new lines will consist mainly in the running of feeder lines into developing territory; opening up agricultural areas so that farm and orchard produce may be packed near by and transported with dispatch to markets far distant; similarly, these feeders will be required to open up timber areas and large coal, copper and other mineral deposits.

"Generally, these lines will be relatively short, ranging in length from a few miles to seldom over 100 miles.

"More and more industrial tracks will be constructed. Every industry in cities—every packing plant, manufacturing plant, sawmill or mine, wherever it may be situated will demand track service, the controlling principle being that economy of operation and abilities to make quick deliveries, necessitates railroad car delivery in, of raw products, and railroad car haulage out, of finished products.

"Railroads are being urged by public authorities to replace existing passenger stations with more ornate and commodious structures. There will always be a reasonable expenditure of money along these lines.

Design for Service

"It has been held that while railroads are required to provide adequate facilities, they are not requested to furnish buildings of monumental design to meet the demands of civic enthusiasts. Structures should be designed for service and economical operation, but with due regard to architectural proprieties.

"Freight house construction will follow along lines of improving existing plants, changing frame structures to fireproof buildings and the installation of labor-saving devices in handling freight.

"There will be construction of new and enlargement of existing machine shops, car shops, engine houses and locomotive erecting shops, made necessary by the never ending growth of locomotives.

Grade-Crossing Separation

"There will be a program of grade separation, as between railroads and highways. The expenditures on such work will increase with the passing of years, as population density increases, and highways become more and more congested with automobiles.

"The separation of grades will be accomplished naturally by either passing the highways under the railroad through subways, or passing them over the railroads by viaducts, but more and more attention will be given to the relocation of highways to eliminate existing crossings with railroads."

Trade Standards Adopted by Compressed Air Society

THIS booklet embodies the result of extended study and research on the part of the executives and engineers associated with the members of the Compressed Air Society and embraces the nomenclature and terminology relating to air compressors and their operation; a history of the development of speeds of air compressors; an explanation of capacities and pressures; instructions for the installation and care of air compressors with illustrations of devices suggested for cleaning the intake air; recommendations for the lubrication of air compressing machines and the cleaning of air receiver piping; a description of the low pressure nozzle test recommended by the society, and a partial list of applications of compressed air.

The Compressed Air Society publishes this booklet with the belief that there is a need for such an authoritative work of reference and that compressed air engineers and users as well as manufacturers of air compressors will appreciate this step toward the establishment of definite trade standards.

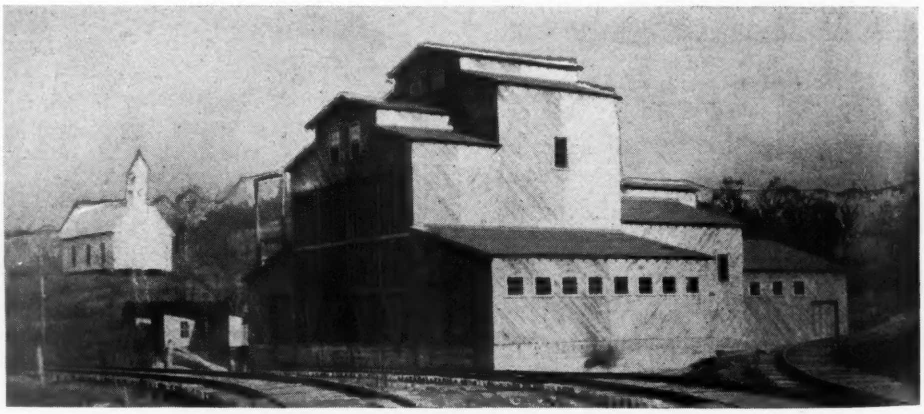
North State Feldspar Company Buys Goog Rock Mines

THE North State Feldspar Corp., of Micaville, N. C., operating a large grinding plant at Cane Branch, N. C., (1 mile east of Micaville) and the Cedar Cliff mine and Bee Ridge mine, both of which are near the grading plant, has recently acquired the Goog Rock mines, Yancy County, N. C. These mines have been known for years and are said to produce a high grade of ore. The mines are thoroughly equipped with modern mechanical devices for mining and transportation of the crude feldspar. While there was no interruption in the production since the time the property changed hands, the North State Feldspar Corp., has extensive plans under way to increase the production at the mines very considerably. The different mines produce different grades of spar which are blended at the grinding plant.

Preliminary work is being carried on at the Cedar Cliff mines with a view of increasing production. Additional equipment and machinery, inclusive of a tram road to facilitate hauling, is expected to be installed this spring. New grinding machinery has been delivered at the mill of the company and is now in its course of installation, which, when in operation will nearly treble the present grinding capacity. Approximately $25,000 has been authorized by the board to carry on this extensive program. A description of the grinding plant and operation methods was published in ROCK PRODUCTS, Nov. 28, 1925, issue.

The supervision of the corporation's mines is in the capable hands of Zeb Thomas as superintendent. W. B. Robinson, superintendent in charge of the steam-electric power plant and the grinding mill, is keeping production at its maximum and is responsible in no small measure for the high quality material that the company ships to the northern market.

The corporation's entire operations are under personal supervision of Rudolph Glatly, who organized the company and has largely contributed to its rapid growth.



Grinding plant of the North State Feldspar Co. at Cane Branch, N. C.

Scientific Basis of the Lime Burning Process*

Kiln Gas Analysis Useful in Determination of Kiln Efficiency

By Dr. G. Keppeler

IN THE HEAT of the lime kiln limestone is decomposed to give calcium oxide and carbon dioxide, according to the equation: $CaCO_3 = CaO + CO_2$. Thus one hundred kilograms of calcium carbonate will yield 56 kilograms of lime and 44 kilograms of carbon dioxide.

Inasmuch as in general practice the limestone burnt is quite pure, the output of lime is very close to the theoretical value of 56%. If this yield is higher, then it follows that the limestone has not been completely burnt. The excess yield merely consists of pure limestone from which the carbon dioxide has not been completely removed. The part of the lime which consists of incompletely burnt limestone can be very readily demined from the fact that 44 parts by weight of carbon dioxide are obtained from one hundred parts by weight of limestone. Thus if the yield of lime is A per cent in place of 56% on the original 100 parts of limestone, then the undecomposed limestone in the lime is found from the equation: $(A-56)\dfrac{100}{42} = 2.28\ (A-56)$. Then again the total lime in the burnt limestone, figured on 100 parts of the original material, is equal to $100 - \dfrac{2.28\ (A-56)\ 100}{A}$

It is possible to define this expression, as the "degree of decomposition" of the limestone. For example, if sixty parts of lime are obtained from one hundred parts of the pure limestone, then the degree of decomposition is equal to $100 - \dfrac{2.28\ (60-56)\ 100}{60}$ which is equal to $100 - 15.2$ or 84.8%. In using this rule in practical work, it is essential to take into conisderation the content of the limestone in impurities and the loss that occurs in the production of lime.

The interest of the purchaser requires that this degree of decomposition is to be brought to as close to 100% as possible, for in most cases only pure lime has any value in use and in all cases the proportion of unburnt limestone in the lime entails extra cost of freightage.

Volumetric Relationships

The gravimetric relationships which have just been described are well known as a general rule. Less accurate information is prevalent on the volumetric relationship between the various substances that enter into the lime-burning process. The solid lime, calcium oxide, has a higher specific gravity (3.08), than the limestone (2.72). It may be assumed that one kilogram of calcium carbonate will occupy the space of 368 c.cm. The 560 grams of lime that are obtained from one kilogram of limestone when packed tightly will occupy a volume of 182 c.cm. which is only one-half of the original volume of the limestone. However, the lime that is obtained from the carbonate is not a dense substance, but highly porous. Nevertheless the shrinkage to half the volume, which is indicated from the specific weight, actually takes place. As every lime burner knows, the limestone during the burning process undergoes no very great contraction, amounting only to 10 to 12%. The burnt lime is therefore considerably more porous than the limestone.

However, as the temperature rises, the density of the calcium oxide changes. When the lime is burnt at moderate temperatures the density is, as has been mentioned above, 3.08.

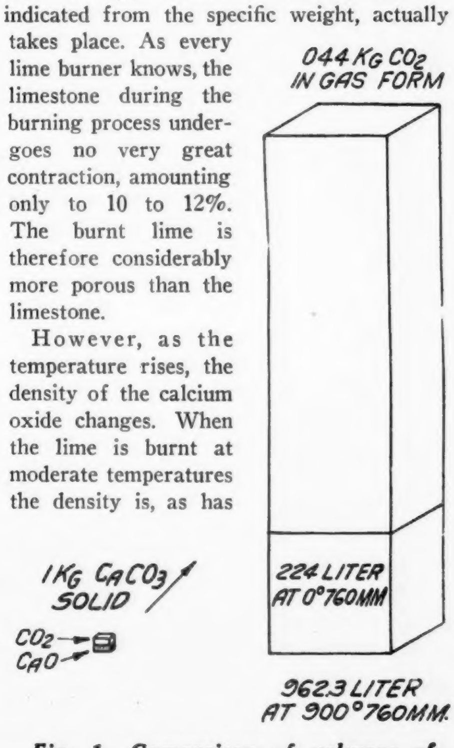


Fig. 1. Comparison of volumes of 1 kilogram of limestone and the CO_2 gas evolved from it at 0 deg. and 900 deg. C. at constant pressure

As the temperature increases, on the other hand, the density becomes greater and approaches more and more closely the value 3.4. It has been assumed that the calcium oxide occurs in two forms, one of which is less dense than the other and is probably amorphous, and the second modification is crystalline, in cubic crystals, and possesses the specific gravity of 3.4 and the index of refraction of 1.83. The first modification is stable at low temperatures and the second at higher temperatures. The point at which conversion from one form to the other takes place lies in the neighborhood of 400 to 430 deg. C.

In lime burning the amorphous modification is formed and the conversion into the crystalline variety takes place very slowly. On the other hand the change sometimes takes place very clearly in the lime kiln. It is therefore well known that the density of the burnt lime increases as the temperature of burning is raised. The increase in the density of the lime is manifested in the reduction of the speed with which the lime slakes.

The volume of the evolved carbon dioxide gas deserves special consideration. The ten gram molecules of carbon dioxide that are evolved from one kilogram of the limestone will occupy a volume of 224 liters at a temperature of 0 deg. C. and 760 mm. pressure. This volume is, however, increased to a very considerable degree by the fact that the lime-burning process is carried out at quite high temperatures. If the lowest temperature at which vigorous evolution of carbon dioxide takes place is assumed to be 900 deg. C., then the evolved carbon dioxide will occupy a volume of 963 liters. Then again at a temperature of 1,200 deg. C., which is the highest found most commonly in practical lime burning, the volume of the gas will be another 250 liters greater, and at a temperature of 600, at which the carbon dioxide gas is most generally withdrawn from the lime kiln, the volume will be 250 liters less. The importance of these volume relations often escapes the attention of the practical man.

Thus in Fig. 1 there is given the cubical space that is occupied by the quantity of carbon dioxide gas that is evolved from one kilogram of calcium carbonate, and this is compared with the volume of one kilogram of the limestone which is equal to 367 c.cm. temperature of 0 and 900 deg. C. The figure clearly indicates the very dense manner in which the molecules are packed together in the solid crystal form, and at the same time it shows what an extraordinarily great volume of gas is derived from the lime kiln while they are burning limestone.

In this connection it must be borne in mind that the fuel, which is used to supply the heat necessary for the burning of the limestone, also evolves considerable volumes of gases during its combustion. Hence in order to study the real relationships between these volumes, it is necessary to take them into consideration as well.

The oxygen in the air affects the combustion of the fuel in such a manner that

*Translated by Universal Trade Press Syndicate from the Zeitschrift Angewandte Chemie, 1925 (397-405).

when one part by volume of oxygen combines with carbon to give carbon dioxide, in the place of one volume of oxygen there is formed one volume of carbon dioxide gas. If the oxygen in the air that is supplied for combustion is entirely consumed, then there will be obtained a flue gas consisting of 21% by volume of carbon dioxide and 79% by volume of nitrogen. All flue gases which are formed with excess air supplied for combustion may be considered as mixtures of gases containing 21% carbon dioxide and pure air. If we then consider not a pure carbon, but a fuel of the character that is used in practical lime burning, then the moisture content of the fuel reduces the maximum attainable carbon dioxide in the gases of combustion through the formation of water vapor. Thus in the case of the average hard coal there are obtained 18.6% of carbon dioxide and 81.4% of nitrogen. The possible flue gases, therefore, are mixtures of various amounts of a gas, consisting of 18.6% of carbon dioxide and 81.4% of nitrogen, and another gas consisting of 21% of carbon dioxide and 79% of nitrogen. When a graphical study is made of this subject, it is found that the carbon dioxide contents will form a straight line, which is drawn between the point 18.6 over the zero point on the oxygen scale and the zero point over 21 oxygen for the case of pure air.

Now in the case of the lime kiln we are dealing not only with carbon dioxide which is obtained from the combustion of fuel that is rich in carbon, but also with the carbon dioxide gas which is obtained from the limestone on burning. However, the quantity of carbon dioxide which is derived from the limestone may be connected in a logical fashion with the amount of the same gas that is derived from the burning of the carbonaceous fuel. Every cubic meter of gases of combustion results, to be sure, from the burning of a certain definite amount of coal, and at the same time the burning of this amount of coal releases a certain definite amount of heat energy, which in itself can release a definite amount of carbon dioxide gas from the limestone. But in order to simplify this calculation we must assume in the first place that the heat which is evolved during the combustion process is utilized entirely for the decomposition of the limestone.

It, therefore, follows that in the combustion of the aforementioned coal to give 100 liters of flue gases with a content of 18.6% of carbon dioxide there will be mixed therewith an additional amount of carbon dioxide, 60.3 liters which are obtained from the decomposed limestone. Therefore, there will be obtained a gas which has the following composition: $\frac{(18.6 + 60.3)\ 100}{160.3}$ or 49.3% of total carbon dioxide, whereat $\frac{60.3}{160.3} \times 100$ or 37.7% of the gas is obtained from the limestone, and $\frac{18.6}{160.3} \times 100$ or 11.6% of the gas is obtained from the combustion process itself.

If now the combustion processes is carried out with an excess of air, then relationships arise which can be analyzed as being composed of two actions, one the complete combustion of the carbonaceous fuel without the excess of air and the other the admixture of a certain amount of excess air to the products of combustion that are obtained in this manner. Hence it follows that a lime kiln gas is composed at all times

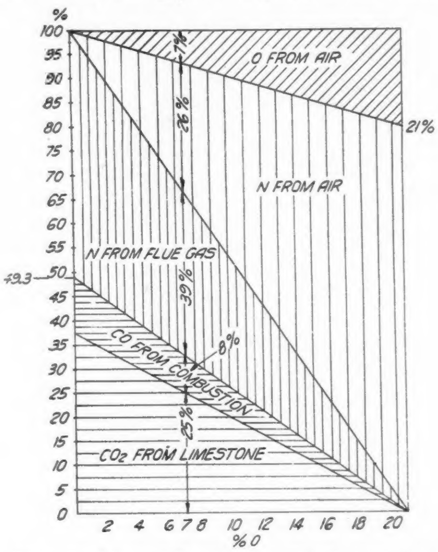


Fig. 2. Lime kiln gases with increasing excess of air

of three parts, each of known composition, namely, first, the gases obtained from the complete combustion of the fuel without excess of air; second, the carbon dioxide gas which is evolved from the limestone, and third, the excess air.

If these factors are represented in a graphical form, as is seen from Fig. 2, they become very much easier to understand and appreciate. The possible oxygen contents are plotted on the base line. At the left at the zero point is represented the gas that is free from air and therefore free from oxygen. At the right at point 21 is represented the pure air. Above the zero point on the bases there is arranged the composition of the lime kiln gases, which is obtained under the conditions of complete combustion, complete utilization of the heat evolved and without the excess of air. This composition of r corresponds to 49.3% of total carbon dioxide and 50.7% of nitrogen. Over the point 21 there is found pure air with 79% of nitrogen and 21% of oxygen. In this gas there is present neither carbon dioxide obtained from combustion nor any of the gas obtained from burning of the limestone.

Inasmuch as all lime kiln gases are mixtures of these two limiting gaseous compositions, the proportions of different gaseous ingredients which lie between these limits must be found on straight lines which are drawn between the points of the limiting compositions. There are thus obtained five triangular diagrams, which are as follows: One, a carbon dioxide diagram representing the gas obtained from the lime burning; two, a triangular diagram referring to the carbon dioxide obtained by combustion of the fuel; three, a triangle representing the nitrogen in the combustion gases; four, a triangle representing the nitrogen in the excess air, and five, a triangle representing the oxygen in the excess air.

The first triangle represents the first portion of the kiln gas composition. The triangles 2 and 3 give the second part of the kiln gas composition, that is the ideal combustion gas, and the remaining two triangles yield the third part, or in other words, the excess of air that is mixed with the combustion gases.

It is therefore now possible to read off from the diagram the composition of any kiln gas which results according to the conditions that have been laid down in the above for every percent of oxygen. Thus, for example, if the gas contained 7% of oxygen it will be found that the composition will be 25% carbon dioxide from the limestone, 8% carbon dioxide from the combustion of the fuel, therefore a total of 33% of carbon dioxide; furthermore 34% of nitrogen from the combustion gases and 26% of nitrogen from the excess of air, which means a total of 60% of nitrogen. In this way of writing the composition of the kiln gas all the same chemical constituents are added together, but then again it is possible to write the composition in another manner according to the origin of the ingredients of the kiln gas, thus, 25% of carbon dioxide from the decomposition of the limestone, 42% of combustion gases and 33% of air.

This calculation makes it very clear that simple relationships exist between the individual magnitudes. A gas analysis yields only the total carbon dioxide, the total nitrogen and the oxygen. The graphical representation shows that there are several proportions that can be written between the various factors, and that we are therefore in the position to distribute the total amount of nitrogen and carbon dioxide between the air, the combustion gases and the gas from the limestone burning itself, and in this manner it is possible to obtain a correct idea of the manner in which the lime-burning process is taking place in the kiln.

For example, it has been found that the kiln gas contains 33% of carbon dioxide, 7% of oxygen, 60% of nitrogen. The following conclusion can be arrived at. The nitrogen that corresponds to the 7% of oxygen is equal to $7 \times \frac{79}{21}$ or 26.3%. As the total amount of nitrogen present is 60%, the nitrogen obtained in the form of gases of combustion is equal to 60 — 26.3 or 33.7%. Inasmuch as in an ideal combustion gas that is obtained from the burning of coal there are contained 18.6% of carbon dioxide and 81.4% of nitrogen, there belong 33.7% of nitrogen, the percent of car-

bon dioxide will be $33.7 \times \frac{18.6}{81.4}$ or 7.8% of CO_2. There will now remain $33 - 7.8$ or 25.2% of CO_2 from the limestone.

Assumption has been made that the entire amount of heat developed is employed to useful purpose in decomposing the limestone, but this is not so in actual practice. It may be assumed that 10% of the heat developed goes to waste in the actual lime-burning process and so there are not produced for every hundred liters of combustion gases 60.3 liters of carbon dioxide, but 60.3×0.9 or 54.3 liters of the gas, with the result that the kiln gas contains only 45% of carbon dioxide $\left(\frac{18.6 + 54.3}{154.3} \times 100\right)$. When the loss of heat is 20% then in like manner the carbon dioxide content of the kiln gas will reduce to 40%.

It must, however, be borne in mind as well that excess of air can enter the kiln during the combustion of the fuel. If in rough approximation the specific heats of the gases of combustion are assumed to be alike, then it may be assumed that in a mixture containing 90% of the ideal combustion gas and 10% of air excess the heat loss will amount to 10%. Heat loss is also directly connected with the oxygen content of the flue gases. With an air excess of 10% there is present in this air 2.1% of oxygen. At the same time the carbon dioxide content is reduced by about one-tenth of its highest value.

In order to unite the two influences, or factors, it is best to use graphical means as seen in Fig. 3. The increasing percentages of oxygen are plotted on the X axis from 0 to 21. The CO_2 content of the flue gases is plotted on the Y axis. This refers to the carbon dioxide in lime kiln gases

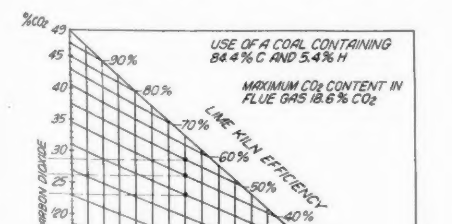


Fig. 3. Efficiency of lime kiln in relation to CO_2 and O content of fluegas

without the excess of air. Pure air values are to be found on the ordinate drawn at the point 21.

On the Y axis to the left there are plotted several contents of CO_2 in the kiln gas without the excess of air, but with decreasing heat efficiency in steps of 10%, thus with 100, 90, 80% thermal efficiency. To these percentages there correspond 49.3, 45, 40, etc., percentages of carbon dioxide. The point 49.3 carbon dioxide on the left Y ordinate is connected with 21 on the oxygen scale, and on this line there will be found all the gases which are obtained under the condition of complete heat transmission, but with varying excess of air in the combustion. If, for example, it is desired to find the effect of each 10% of air excess, then it is only necessary, as is shown in the figure, to divide the line into ten equal divisions.

In this manner the two factors controlling efficiency are separated. If now the points of equal efficiencies are connected by means of straight lines, then the lime-kiln gases of equal efficiencies lie on these lines. For example, if a gas with 7% of oxygen is selected, then it is found that with this oxygen content and with 23% of CO_2, the efficiency will be 30%, and with 26.3% of CO_2, the efficiency will be 40%, and with 29% CO_2, it will be 50%.

The efficiency of the common lime kiln is very varied, depending to a great extent on the manner of its construction and operation, and it will vary as much as from 20 to 60%, not including very bad operation. A total CO_2 content of 20.2 or 33% corresponds to these efficiencies with 10% or 7% of oxygen in the flue gases.

From what has been said it is apparent that the cubic volume occupied by the gases derived from one kilogram of limestone amounts to from 3 to 7, and in many cases as much as 7 times the volume of the carbon dioxide evolved from the limestone, and at a temperature of 900 deg. C. this is from 3 to 10 cu.m. per kilogram of limestone. These calculations have been made on the basis of a dry gas, and the volume of the gases is accordingly increased by the amount of water vapor that is developed from the moisture in the limestone, in the air and in the fuel as well as from the combustion of the hydrogen in the latter.

(To be continued)

American Refractories Institute to Hold Annual Meeting

THE annual meeting of the American Refractories Institute will be held in Philadelphia, Penn., on May 12, at the Bellevue-Stratford hotel. Plans are under way to have a number of papers presented by technical and practical men of the industry, and floor discussions of these papers will be invited. In addition, several prominent speakers will be asked to talk.

New Rotary Kiln Now in Operation at American Lime and Stone Plant at Bellefonte

ON February 28, fire was built in the gas-producer of the new rotary kiln and on March 3, the kiln was started rotating. Stone was put into the kiln on March 5 and the first lime came through about 8 p.m. the same day.

Who Owns the Lake Bottom?

THE question of ownership of the lake bottom and the control of its use has once more arisen. The Detroit, Mich., *News* comments on this editorially as follows:

"Working on the theory that the state of Michigan has full control of the bottom of our Great Lakes from the high water mark or meandered line inshore out to the International boundary line, our conservation officials for years back have attempted to control the use of this bottom land for all purposes except navigation. This applies particularly to the commercial fishing industry and the taking of sand and gravel.

"The latter operations have netted the state around $40,000 a year. For this privilege Michigan has been receiving ten cents a cubic yard for sand and sixteen cents for gravel.

"Now, the Great Lakes Sand & Gravel Co., operating in Lake Michigan in Michigan waters, refuses to pay future tribute to the state for any material which its dredges or suckers may take. They base their refusal upon a decision recently handed down by Indiana courts which held that the bottom of the Great Lakes cannot be properly called the property of anyone.

"This question of lake bottom ownership, so far as Michigan's interest can be served, has never reached the highest tribunal of the state. It would seem that the time is now opportune to have the courts definitely determine the state's rights. In addition to other matters it certainly would settle once and for all the question of riparian ownership along the Great Lakes which has bobbed up in every session of the legislature since 1917 and created nothing but trouble and ill-feeling between those interested."

Montgomery, Alabama—Fort Benning, Georgia Sand and Gravel Rates Upheld

ATTORNEY-EXAMINER F. C. HILLYER has advised the commission to dismiss No. 17405, E. A. Bahel and Co. vs. Central of Georgia, on a finding that rates on sand and gravel, from Montgomery, Ala., to Fort Benning, Ga., between May 28 and October 21, 1924, were neither unreasonable nor otherwise unlawful. The complainant alleged the rates were unreasonable and illegal. The shipments moved 99 miles over the rails of the carrier and six miles over a military railroad, the operation of which was taken over by the defendant on June 15, 1924. In applying rates the defendant applied the rate for 99 miles prior to the taking over and 105 miles thereafter. The question was one of application of rates which the examiner admitted was confusing, but he said the shipments were on a tariff governed by exceptions to the Southern Classification and on that ground he came to the conclusion before set forth.—*Traffic World.*

Dust Arresters and Precipitators for Portland Cement Mills

Methods Employed in European Plants Described by Their Inventor

By Frank F. Stelz
Consulting Engineer, Jersey City, N. J.

AMONG the various devices used up to the present time for dust collecting and air purifying purposes, there is no mechanical sifter capable of eliminating matter up to a fineness of 10,000 meshes.* As the dust collectors and "cyclones" designed to date are lacking in fineness, use is still being made of bag filters.

Through uniform operation and regular elimination of the product, my "Stelz" separator-sifter has proved to be economical, reliable, non-clogging, and to require no repairs.

No explosions or dangerous pressure conditions can result during its operation. Aside from these advantages, it requires no operator and no attention, the process being purely mechanical for all substances.

In special cases an addition (*N* in Fig. 1) may be built over the top of the separator. Coils of wire are placed on the inside of this device receiving a high tension current up to 150,000 volts at 170 milliamperes. In this manner it is possible to attain a purification of 99.8 to 99.9%; however, this method is used only for handling costly dust or gases. The current consumption is very low, as the locally available current at 110 volts is raised to 150,000 volts by means of a small transformer. A description of this device is given further in this article.

In cases when the dust is almost incandescent at high temperatures or when it contains a high percentage of water or acid vapors, the separator is provided with a vacuum sprinkler. As soon as the air current, which is to be purified, enters the suction chamber, it meets a very fine spray of water under pressure produced by a rotating fan specially designed to cause the water to penetrate uniformly to all parts of the chamber. The mixture of water, dust and air, the direction of which is now altered, collides with the paddles of the fan and is thrown into the separator, where it encounters inclined baffle plates. This impact, together with a change in the direction of the air current, produces a temperature of about 160 deg. C. in the separator, so that all dust particles loaded with water settle down and finally leave the separator through the conical section at the bottom as a turbid stream, which may be led into a settling basin. The now completely (99.9%) purified air leaves through the opening at the top of the separator. The water consumption of this device is very small and can be determined in accordance with the amount of dust to be collected.

*That is 10,000 meshes per sq. cm. (about 250-mesh).

Frank F. Stelz

THE author of this article is an engineer who has been actively engaged in the design and installation of dust collection systems for many years in Germany and other European countries. Besides the type of collector described here he has several other designs patented in foreign countries and which he hopes to successfully introduce in this country.

A notable advantage of my separator is that it does not need a fresh supply of water, as the water from the settling basin can be used over again. The power consumption is exceedingly low. The entire apparatus may be built of strong sheet steel, which should receive an acid- and rust-proof coating on the inside, or it may be provided—in exceptional cases—with a tin or lead lining affording sufficient protection against harmful agencies.

The industrial application of my separator has been successful for a long time at many European cement, lime, and crushing plants. It is particularly adapted to cement, lime, sulphate, phosphate, soft coal, and chemical plants, the dye industry, ore concentrators, grinding, castings, blast furnace operation, as well as for the removal of dust from hot gases, smoke, the purification of dust vapors and acid gases.

Operation of Separator-Sifter

The dust loaded air or the gas mixture passes through the apparatus in eight different directions and velocities. Through tin guides provided in this device the air current receives a spiral course, which constitutes the first stage in dust removal. The dust falls into the vertical pipe *K* (Fig. 1). By widening the cross-section the velocity of the current is now slightly reduced and the second stage of separation takes place. The centrifugal force of a fan again changes the direction of the air current, which is thrown in cyclones against the baffle plates and falls into vertical pipe *L* (Fig. 1).

This stage is followed by the finest sifting of the dust or smoke residue in a rotating filter provided with suction tubes, which rotates under vacuum, permitting the most minute sifting. The latter process insures a degree of purification of about 99.8 to 99.9% (*M* in Fig. 1).

Electric Dust Collecting and Gas Purification

Electric dust collecting devices have been in use successfully for 10 years. This method insures a 99.8 to 99.9% purification for all kinds of dust and gases, such as smoke, blast furnace gas, chemical gases and vapors, cement, lime, alumina, etc.

The fundamental principle of electric gas purification consists in injecting the gas into a high tension electric field. Through the magnetic action and radiation of electricity

the suspended particles become activated in a manner depending upon whether direct or alternating current is used. Under the action of a direct current all particles become charged, regardless of whether they are good conductors or of non-conducting material, metals, non-metals, moisture drops, mists, etc. In tending to give up their charge, the particles travel to the discharge electrode from which they are removed by mechanical tapping or blowing. Part of the settled material falls off the electrode due to the weight of the accumulated lumps and settles in the hopper placed below the electric filter. This dust is handled further by means of screw or belt conveyors, suction apparatus, etc.

Aside from the effect of the electric charge, settling is further aided by an electric wind. This phenomenon may be explained as follows: It is a well-known fact that bodies of similar charge tend to repel each other. The negatively charged gas ions are repelled by the negative electrode and drift with high velocity to the positive discharge electrode. This produces a strong current, which is termed an "electric wind."

Though alternating current has been used for this purpose and has the advantage of being more easily available, it has not given as good results. It seems that its use is limited to certain cases. It has been shown that the removal of coarse particles proceeds just as effectively; the fine particles, however, whose elimination is of greater importance in most cases, cannot be removed as completely. The charging electrodes, which generally receive negative electricity, are placed opposite the positive discharge or settling electrodes which may be in the form of plates, grids, or cement plates. The gases are made to pass in a direction parallel to the electrodes so that no losses are encountered due to draft or deviation of current —an advantage unparalleled by any other method of purification.

At first, it seems surprising that the dust falling from the discharge electrode is not caught and carried on by the gas current. This is due to the formation of lumps at the positive electrode which produce little dust in falling. Such dust, as escapes, is immediately subjected to the same process of recovery.

The installation generally permits shutting off the different chambers without interfering with the general process, while these are being cleaned.

The d.c. current is not constant but is interrupted. In Europe and the United States the number of interruptions is designated 50, or a frequency of 100 vibrations per second. The gas current is, therefore, exposed to electric shocks which aid the settling of dust. The interruptions of the current and its uniform direction are produced by a rotating plate with metallic segments, rotating at the rate of 1250 to 1500 r.p.m. As in all high-tension apparatus automatic safety devices and signals are provided to prevent short circuits and other disturbances.

High Voltage With Low Current

While electric gas purification makes use of relatively high voltage—20,000 to about 150,000 and 250,000 volts—the current is very low (similar to that for X-ray use) and is

measured in milliamperes $= \frac{1}{1000}$ amps.

Possible short circuits are, therefore, of little importance and cannot be compared to the damages caused by short circuits occurring daily in electric power plants.

Because of the low current no real danger is present to the employes in spite of the high tension. In 350 plants in Europe and the United States where use is made of this type of installation no serious or fatal injuries were reported to date.

The space required by this installation depends upon the gas volume to be purified and on the degree of purification desired. A gas volume of 100 cu. m. per min. with 5 gm. dust content per cu. m. the degree of purification of 98.6 to 99.7% may be attained in an electric chamber of 10x10x25 ft. A

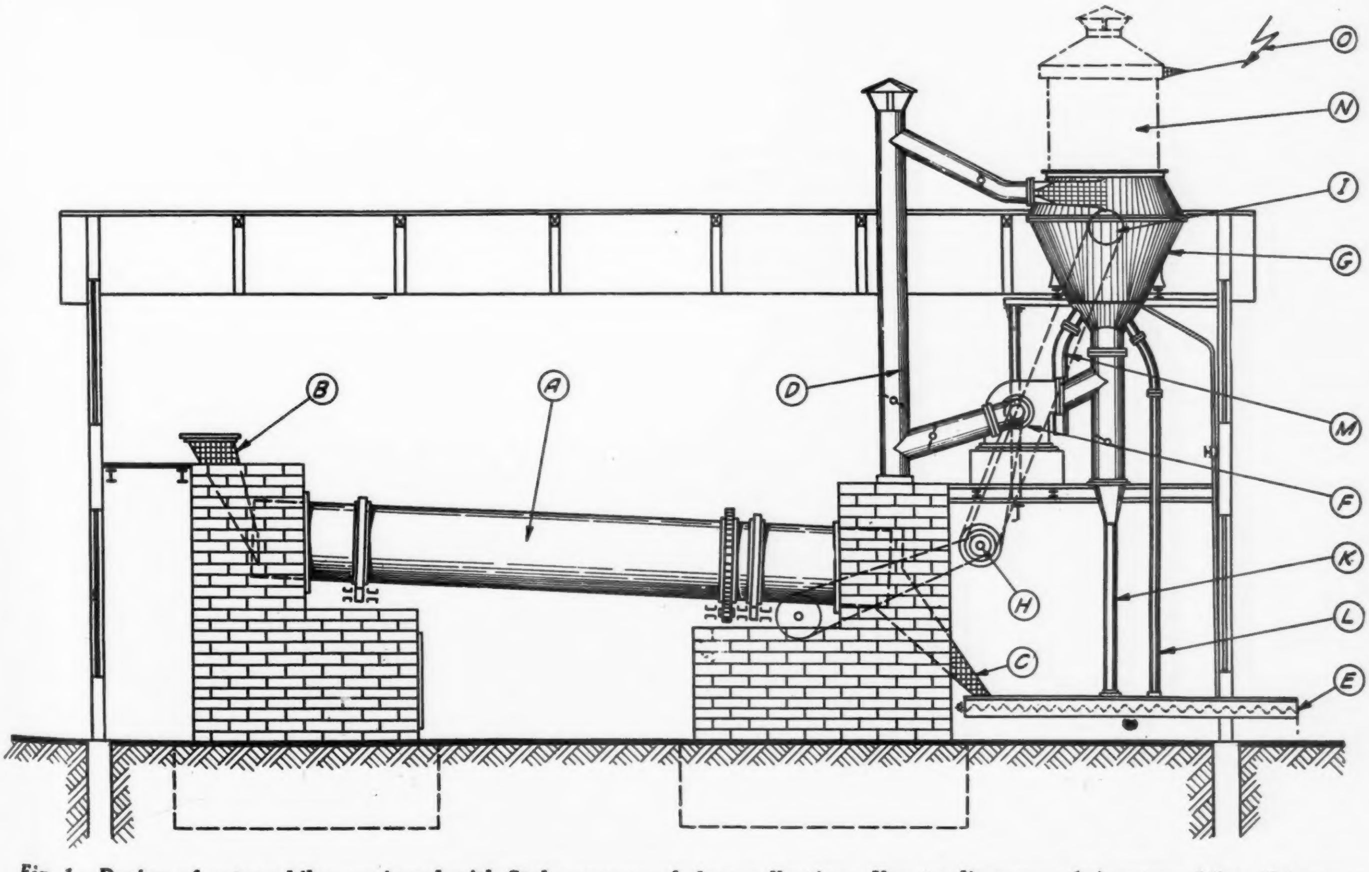


Fig. 1—Design of rotary kilns equipped with Stelz process of dust collecting. Key to diagram: (a) rotary kiln; (b) conveyor feeding the raw mix to the kiln; (c) clinker conveyor from kiln or from cooler; (d) exhaust for dust; (e) cement conveyor; (f) exhaust fan; (g) Stelz separator-sifter; (h) motor; (i) filter-fan; (k) product of the separator, No. 1, coarse; (l) product of the separator, No. 2, fine; (m) product of the separator, No. 3, finest dust which is incorporated in the cement; (n) electrified chamber for dust precipitaion; (o) special dust-collector with electric coils for exceedingly fine absorption of dust

masonry or concrete chamber of this capacity should measure 15x12x23 ft.; i.e., because of the wall space, it would be four times as large, the capacity remaining the same.

The purification of 100 cu. m. of gas per min. requries only 4 k.w. power, this figure including about 1.5 k.w. consumed for interrupting the current. This consumption does not increase in direct proportion, the power required by the electric purification of 1000 cu. m. of gas being only 20 k.w.

Efficiency

The degree of purification which can be achieved in this installation, i. e., the efficiency of the dust collecting system, depends first of all on the velocity with which the gases pass through the electric field. The longer time during which the gases are exposed to the action of the electric field, the higher the degree of their purification. In many cases such as collecting the dust of cinders, cement, lime, crushed stone dust, phosphate, gypsum, slate, and other varieties of dust of little value it is sufficient to collect only the coarser material—about 75 to 85% of the dust. For valuable substances such as metals, soda, soap powder, alumina, dyes, sulphur trioxide, arsenic, it is expected to attain as high degree of purification as possible. Installations of this type are maintaining 98 to 99.8% efficiency and more; i.e., they leave no residue.

This degree of purification may be, if required, raised further, so that the most careful chemical analysis would hardly detect traces of the solid or liquid constituents originally present in the gases. It is thus that the waste gases of blast furnaces upon purification are used in the power generating machinery.

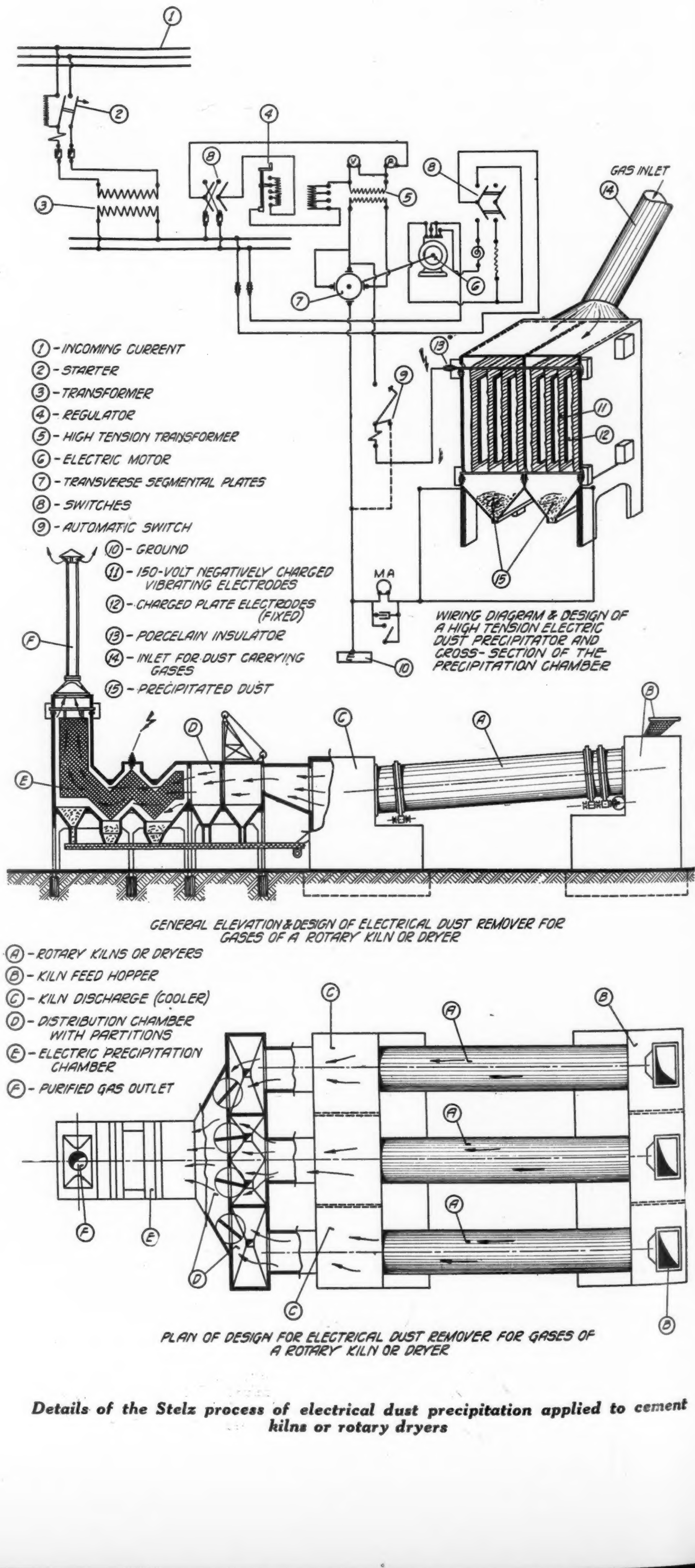
Cost

The cost of the electric dust-collecting installations depends naturally upon the composition of the gases which are being purified, their temperature, acid- and dust-content, as well as on the desired degree of purification. In general, the cost is approximately like that of dry or sprinkling purification systems and may be 25% lower.

Though for years installations have been in operation handling explosive and easily combustible gases, no explosions have as yet been recorded. This may be explained by the fact that the process takes place in a closed space with almost complete exclusion of air. If sparks are produced by a short circuit, combustion cannot occur due to lack of oxygen. In this connection it is interesting to consider installations handling such easily combustible dust as zinc oxide, tin, etc. Purification may proceed at such high temperatures that the dust becomes immediately ignited upon leaving the chamber and becoming exposed to the oxygen of the air. The same is true in the elimination of soft coal dust. The dust becomes easily ignited and should be handled with care.

Estimate for the Installation of an Electric Dust Collecting System

Dry process cement manufacture by rotary



Details of the Stelz process of electrical dust precipitation applied to cement kilns or rotary dryers

kiln. Waste gas: 400 cu. m. per min. at 175 deg. C.

CHEMICAL ANALYSIS

SiO_2	32.06
MnO	0.18
FeO	2.12
Al_2O_3	12.01
CaO	45.30
MgO	5.00
S	1.67
BaO	0.15
P_2O_5	0.09
	99.58

Unit weight — loose: 645 gm.

Results: $400 = \frac{400}{60} = 6.66$ cu. m. at 175 deg. C.

The velocity of the gas in the electric dust collecting chamber should be 3.5 to 4.5 m. per sec.

Cross section of chamber: $F = 1.5 \times 2.5 = 3.75$ sq. m.

Deducting the electrodes = 3.25 sq. m.

A chamber has 5 plates and 6 electrodes. Length: 5000 m/m.

Porcelain insulators are used.

Gas velocity $= v = \frac{6.66}{3.25} = 2.48$ m. per sec. at 175 deg. C.

Distance from charging electrode to discharging electrode at 150,000 volts always 175 mm.

Electric tension 50,000 volts.

$$\frac{160 \times 0.5 \times 50{,}000}{1000 \times 0.85 \times 1000} = 4.7 \text{ k.w.}$$

An electric d.c. or a.c. installation furnishing 5 to 6 k.w. is required.

Data for the Plant Shown

Cement manufacture; 3 rotary kilns; gas analysis: 22 to 25% CO_2; up to 2.2% CO and up to 2% O_2.

The dry substances consist of 75 to 77% $CaCO_3$; remainder silica, alumina and iron oxide.

Gas volume: 220,000 cu. m. per hr.

The draft available: 34.4 to 36 mm. W. S. about 21 cu. m. per sec. at 0 deg. C.

GAS MIXTURE

$$47.5 \times \frac{273 + 470}{273 + 300} = 61.3 \text{ cu. m. per sec. at 470 deg. C.}$$

$61.3 \times 60 \times 60 = 220{,}680$ cu. m. per hr. at 470 deg. C., for 3 rotary kilns.

Electric chamber (a double chamber): $(2.5 \times 3.75) \times 2 = 17.94$ sq. m. area.

Velocity in the electric chamber 3 to 4 m. per sec.

$F = 17.94$ sq. m. and $v = \frac{61.3}{17.94} = 3.45$ m. per sec.

Gas velocity in electric chamber 3.45 m. per sec.

Power required: at 0.5 milliamperes, 150,000 volts.

$$\frac{1200 \times 0.5 \times 50{,}000}{1000 \times 0.85 \times 1000} = 35.4 \text{ k.w.}$$

2 high tension installations of 16 k.w. capacity each are required.

Importations of Foreign Cement into Florida, Viewed by a Leading American Cement Producer

IN A VERY INTERESTING discussion of the heavy importations of foreign cement into Florida and some of the reasons therefor, H. C. Koch, vice-president of the International Cement Corp., New York City, one of the great cement manufacturers of the country, writes to the *Manufacturers' Record* as follows:

"From the viewpoint of the manufacturer of building materials, we must consider the entire peninsula of Florida as one, not unlike a newly discovered oil field, gold-mining district or similar condition where no transportation facilities exist. It is true that such were in existence in Florida for many years, but were entirely inadequate for the peak load that arrived some months ago; however, our example is somewhat extreme, but will suffice.

"From a rail standpoint, the only entrance is by the permit system, on which we believe you require no elaboration, no doubt being conversant with the meaning of the actual working of such an arrangement.

"Although the state is, as indicated, a peninsula, no large development of adequate ports, with the exception of Key West, has ever taken place. Unfortunately, the location of Key West is such that, aside from passenger transportation to and from the Isle of Cuba, it cannot serve Florida to any great extent, and only via two rails of steel over the bridgework connecting the keys.

"You undoubtedly are familiar more or less with our federal laws having to do with shipping in our coastwise waters, the seamen's act and other conditions as they apply to the movement of commodities from one United States port to another. Inadequate dock facilities caused American coastwise boats first to seek passengers who can easily be disposed of upon arrival, and secondly the classes of freight that can carry the highest transportation rate. Therefore, it was not unusual to find rates of $5 and $8 per ton on a commodity such as cement quoted, and steamers and ship companies were not solicitors of this business even at that fabulous rate, preferring to charter steamers with the full knowledge that days, weeks, and even months, would be required at the port of Miami before entrance to docking facilities could be obtained. This, together with rail transportation from a cement-producing mill to tidewater, created a condition which could not possibly be met on a commodity that averages the American producer less than ½ cent per lb. at the point of production.

"With the producer of cement in Norway and Belgium, mills generally were located on navigable waters, if not on tidewater, employing low-priced labor and able to secure shipping space in available steamers at $2.50 to $3 per ton. Considering the value of the commodity just mentioned, the relation to the transportation rate and the benefits of the ship's subsidy, an answer is arrived at quite readily.

"Using gross ton of 2240 lb. as a basis of calculation, the rail rate from Southern mills to Miami is generally $6 per ton, or $1 per bbl. Using the same basis for ocean transportation rate of $3 per ton from European countries, the rate would be 50 cents per bbl. Still, without any duty protection when rail transportation was available, the American manufacturer's superior article vied with and secured practically the entire tonnage of that state against these handicaps, realizing as low as one-third of a cent per pound for his product. He could not successfully compete via rail and water because of conditions mentioned, which has caused a considerable tonnage not only to come from European countries, but from Canada as well, who did not have to overcome the handicaps of the ocean shipping and general transportation rate conditions.

"It may be of interest to you to learn that in Norway a producer, probably the principal mill in that country, has recently suspended operation because of financial difficulties.

"We are of the opinion that when Florida thaws out and rail transportation is again available the American manufacturers, at least those with mills throughout the South with a productive capacity far in excess of what that section can possibly consume, will again be supplying all of the demand within the state, which has become famous for its influx of population and building activities during the past two and one-half years."

Chemical Equipment and Process Exposition of Interest to Rock Products Industries

AT the Second Chemical Equipment and Process Engineering Exposition to be held at Cleveland, May 10-15, inclusive, will be displayed equipment, machinery, materials, accessories, supplies; etc., etc., essential or applicable to the whole multitudinous range of industrial uses embraced within modern processing technology.

The equipment which will be of special interest to all rock products manufacturers includes such as follows:

Centrifugal Separation.—Temperature and humidity recorders, controllers, filter and centrifugal cloths, sieves, mills of varying types, tanks, coils, extractors.

Disintegrating (Crushing, Grinding, Pulverizing) Mills.—Special metals and materials, a wide range as to type, principle and product-adaptability of crushers, grinders, pulverizers.

Hydraulic Separation. — Complete equipment and materials, thickeners, classifiers, clarifiers, agitators, accessories.

Material Handling (Solids, Liquids, Gases Flow of Fluids).—Pumps for new purposes, standard pumps, pumps with special properties highly developed, containers, valves, pipes, tubing, gravity systems, automatic systems, conveying apparatus, controllers, measurers, trucks, presses, accessories, miscellaneous equipment, etc., etc.

Mechanical Separation.—Standard and widely used equipment, machinery and devices; new, or specially adapted apparatus and methods, graders, classifiers, etc., etc.

Mixing and Agitation—Tanks, mixers, agitators, involving different principles of operation and possibilities of adaptation, accessories, materials, etc., etc., in a wide range.

Separation of Solids from Gases.—Materials, vessels, towers, miscellaneous equipment, machinery, regulators, etc.

Thickening and Settling.—Thickeners, coagulators, accessories, continuous systems.

Drying.—Various standard and special apparatus, systems, heaters, regulators, tanks, etc., trays, accessories.

Ball Mill Grinding of Raw Gypsum

Results of a Personal Investigation

By H. J. Brown
Consulting Engineer, Hyde Park, Mass.

IN company with many others interested in the gypsum industry, the methods of grinding raw gypsum preparatory to calcining by the kettle process has been of considerable interest to the writer of this article and has attracted much investigation and research.

With a desire to lessen the cost of such grinding, successive improvements have taken place in the past ten to twenty years, during which time the methods have changed, so that the old style upper runner buhr stones have been replaced by upper runner stones of a similar type, vertical emery and rock emery stones, disintegrators with cages revolving in opposite directions, hammer mills, and finally by roller mills of the Raymond or Bradley types, with air separation, which latter mills have replaced practically all previous designs in the most modern mills.

The writer, however, has sought a more rugged type of grinding machine, and has believed that the time would come when the ball mill, or some other style of machine, having lower repair and upkeep costs, would eventually enter the field. In so far as the ball mill was concerned, however, the experience of one manufacturer who essayed to grind raw gypsum in such a mill in 1910 only to find that the heat developed by grinding was sufficient to start the water of crystallization, and thereby wet the mill contents so that a mud was formed, seemed to preclude the possibility of this type of machine being used.

The starting of the water of crystallization, of course, stopped the grinding process by the forming of a mud, as was mentioned in the previous paragraph. It was not feasible to keep down this heat developed by grinding by any method known at that time, but in the light of present developments the problem has been apparently solved.

The following results were taken from a test run made at Columbia University School of Mines on January 3 of the present year, which was made at the writer's request and for his benefit. The data has been gathered by the manufacturer of the machine under the writer's supervision and is entirely reliable.

Object of test: A. To determine whether raw gypsum, $CaSO_4 \cdot 2H_2O$, could be ground so that 95% would pass a 100-mesh standard screen without raising the temperature of the mill, or of the material being ground to a point where the water of crystallization would be driven off, thus causing the material to pack, "mud up," or clog the mill.

B. To determine the capacity at the stated fineness under the conditions encountered so that interpolated capacities of large units might be approximated.

Equipment used: The equipment used in conducting the test as well as the type of machine installed at Columbia University is shown in the accompanying photograph. The outline sketch shows the installation diagrammatically.

The mill was a 3-ft. by 8-in. silex lined Hardinge conical mill, equipped with a 3-ft. superfine separator having a No. 7 Clarage CI exhauster on the return side of the collector. The ball load in the mill consisted of 500 lb. of steel balls divided into 200 lb. of 1¼-in. balls and 300 lb. of 2-in. balls. Although the mill contained a silex lining, it was considered that this lining was a disadvantage under the conditions of the test. An iron liner would have served better.

Mill speed—32 r.p.m.
Mill power—3.75 h.p.
Fan power—2.5 appx. h.p.
Fan speed—3660 r.p.m.
Feed—raw gypsum passing ½-in. ring.
Total water content—19.8%.
Duration of run—6 hr.
Capacity—400 lb. per hr.
Rise in temperature—imperceptible.

At the beginning of the test run the mill was operated for 30 minutes to thoroughly clean it out and to raise the temperature to normal.

Both feed and product were weighed throughout the test. The maximum permissible ball load was not used owing to the scarcity of feed material available for the test. The mill was stopped as soon as the last of the feed material had left the feeder.

Results of test:

SCREEN ANALYSIS

I. Feed

Mesh	Pct.
Plus ½ in.	0.68
Plus ¼ in.	22.6
Plus 6 mesh	29.15
Plus 10 mesh	14.17
Plus 20 mesh	9.12
Plus 65 mesh	9.38
Minus 65 mesh	14.43

Taken at Conclusion of Test

II. In Mill Feed End

Mesh	Pct.
Plus 4	0.
Plus 10	20.7
Plus 20	13.7
Plus 48	29.8
Plus 100	18.3
Plus 200	11.0
Minus 200	6.5

III. In Mill at Junction of Cylinder and Discharge Cone

Mesh	Pct.
Plus 4	6.55
Plus 10	11.7
Plus 20	13.5
Plus 48	31.1
Plus 100	18.2
Plus 200	9.23
Minus 200	8.20

IV. In Mill Near Discharge

Mesh	Pct.
Plus 4	0.
Plus 10	8.4
Plus 20	10.5
Plus 48	30.1
Plus 100	24.2
Plus 200	15.6
Minus 200	11.2

V. Oversize From Bottom of Superfine Collector

Mesh	Pct.
Plus 35	3.9
Plus 48	4.5
Plus 65	5.06
Plus 100	18.88
Plus 200	23.40
Minus 200	44.50

VI. Product

Mesh	Pct.
Plus 100	.18
Plus 200	4.88
Minus 200	95.04

It will be seen that the feed to the mill was what would be naturally expected from a fine rotary or hammer mill suited to the purpose, and contained no excess of fines which would materially affect the output of the mill under test.

Samples from the mill itself after shutting down are so indicated above. These were removed as soon as the cover plate could be loosened. These samples show that fines are removed from the mill practically as soon as produced in the process of grinding.

Although material of a fineness of 95% through 100-mesh standard screen was set as a standard for the run, the mill actually produced a considerably finer product, showing a capacity for greater output at the fineness desired. Theoretically, more heat was generated by the finer grinding.

It should be noted that the samples of oversize taken from the bottom of the superfine classifier, as shown in sample No. 5, contain a large proportion of minus 200-mesh material. Ordinarily 44.5% of 200-mesh in the oversize taken at this point would indicate faulty operation of the classifier. This may be considered to be the case in the present instance. Evidently the mill would have handled a larger capacity had the classifier operated as intended.

It is safe to assume therefore that the capacity of 400 lb. per hour does not indicate the maximum capacity of the mill, but only that the capacity is at least this amount.

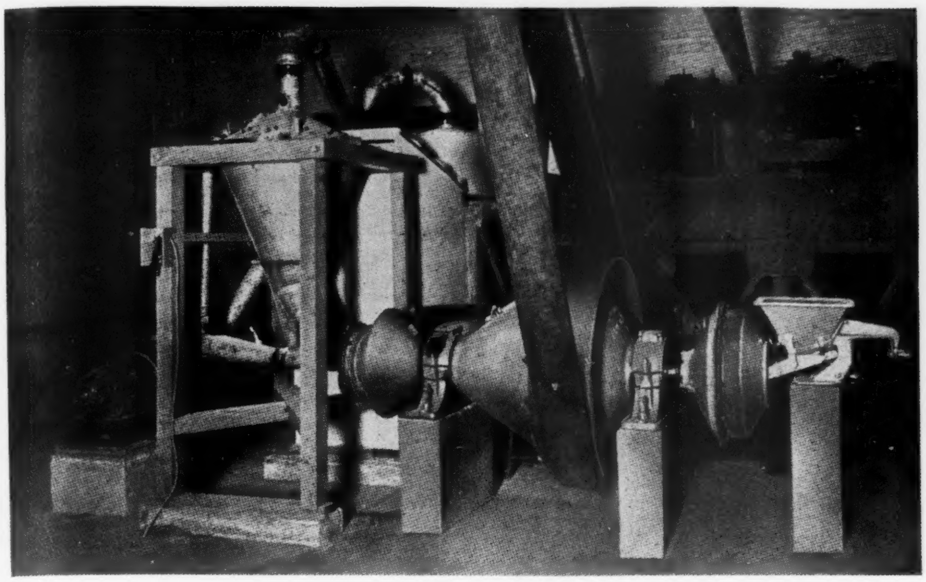
The power consumed by the fan is not in correct proportion to what was actually required for the material under test, as it was necessary to throttle down the fan. A smaller fan could have been operated at higher speed and would have better served to maintain the static pressure needed in this system of air separation.

Based upon the result of this test run, the manufacturers decided it conservative to interpolate the following approximate capacities for mills of the same and larger sizes, as follows:

Ball mill size	Ball load	H.P.	Hourly capacity, 95% thru 100
3 ft. x 8 in.	500 lb.	6	450 lb.
3 ft. x 8 in.	900 lb.	8	800 lb.
7 ft. x 36 in.	22,000 lb.	145	10 tons
8 ft. x 36 in.	32,000 lb.	200	14 tons
10 ft. x 48 in.	60,000 lb.	410	29 tons
10 ft. x 66 in.	75,000 lb.	480	35 tons

These estimates give approximately 14.5 h.p. per ton of material ground, which compares favorably with other types of mills used for the purpose. It is doubtful if types of mills can be found which will do the work for this expenditure of power, particularly when the degree of fineness is taken into consideration.

It is possible that this degree of fineness may be criticised as being too fine, but it has been the writer's experience that material of this fineness calcines more readily, more uniformly, and produces a material having more desirable qualities than a coarser



Mill used to grind raw gypsum

product, even though it is reground subsequent to calcining.

My own opinions of these estimates of power consumption by the manufacturer is that they are too high. Unlike cement rock, ground in ball mills for the manufacture of portland cement, there is less resistance to grinding in handling gypsum, hence the friction developed is less and the cascading of the balls within the mill is more prompt, which should result in lower power requirements.

When it is understood that a mill of the type tested may be obtained with a capacity in a single unit, or at the most in two units, sufficient to supply grinding capacity for kettle feed in the average large sized gypsum plant, it will be readily seen that operating labor can be reduced to a minimum. As for repairs and maintenance charges, the very ruggedness of this type of mill makes for low upkeep charges per ton of output.

It would seem that the ideal installation for this type of mill would be in combination with some other machine. Roller mills, for instance, do better work when fed with a material containing a minimum of fines, as the principle used is that in which the material is ground upon itself between the stationary ring and the revolving rolls. To accomplish this, fairly coarse material is suggested by the manufacturer. With the ball mill a finer feed is permissible, so that in preparing ball mill feed a hammer mill should work most efficiently, as this type of crusher produces a maximum of fines.

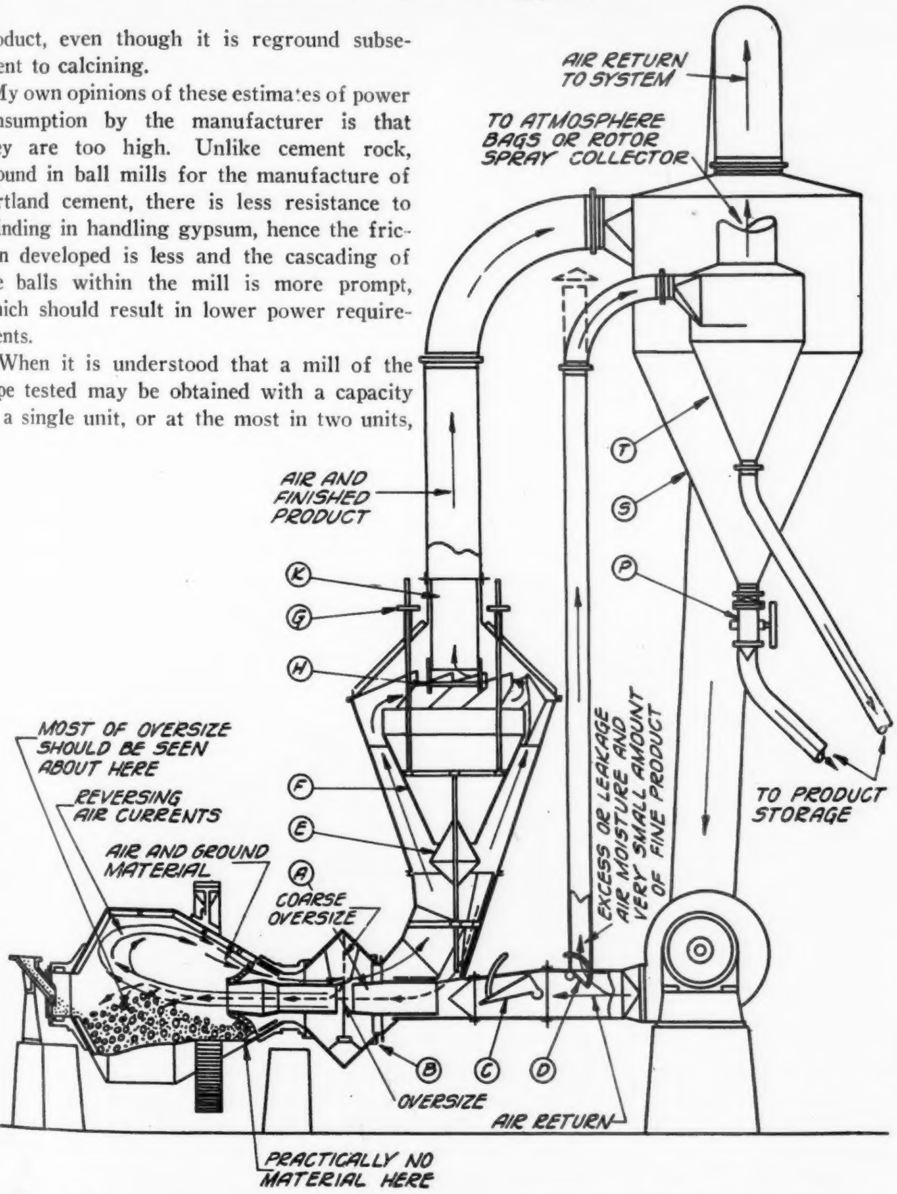
There are hammer mills used in the fine crushing of gypsum which will produce as high as 55% of their output as fine as a 100-mesh product, and this property may well be taken advantage of in a combination of two units for crushing and grinding, since all fines produced by the hammer mill will be removed almost at once in the separating system used in connection with the ball mill of the type tested above, leaving to the ball mill the duty of reducing the balance of the feed to the fineness desired.

As an example of what might be done, we may assume a hammer mill with a capacity of 60 tons per hour, which will produce 55% of output passing 100-mesh standard screen. Such a product would give 33 tons per hour which will pass a 100-mesh standard screen. If all the output of such a mill is fed to a ball mill of the type under discussion, the separating system will remove the fine material at once and the ball mill itself will reduce the remaining 27 tons to 95% through 100 mesh at the specified rate of 27 tons per hour, giving an overall capacity of the combined hammer mill and ball mill of at least 60 tons, with an expenditure for power approximately as follows:

	H.P.
Hammer mill	125
Elevator	5
Ball mill and separator	410
Total	540
Per ton consumption =	9

While it must be borne in mind that the last figures given are conservative estimates, based on the manufacturer's statement, the figures for the hammer mill and elevator are entirely reasonable, and it may be assumed that the manufacturers of the ball mill, with the length of experience which has accrued to them, are not guessing at what can be done.

This article is written so that manufacturers may have the data accumulated at the test mentioned herein, the assurance that raw material may be ground efficiently, without danger of starting the water of crystallization, and an opportunity of confirming the opinions expressed.



General arrangement of mill and air classifiers. Key to diagram. A—Oversize return pipe. B—Sealing ring. C—Air control damper. D—Vent damper. E—Oversize return cone. F—Inner classifying cone. G—Adjusting wheel. H—Damper. K—Uptake pipe sleeve. P—Air lock. S—Product collector. T—Auxiliary collector

Hints and Helps for Superintendents

A Good Loading Hopper

THIS department has published a good many pictures and descriptions of loading arrangements, but few of them can compare with that which is shown in the accompanying picture.

The hopper is placed over the track scales so that cars may be loaded on the scales to the exact weight. It is also at the end of the conveyor that brings crushed stone to be loaded either from the plant bins or from a storage pile.

The unusual feature is the kind of spouts used to draw the crushed stone from the hopper and deliver it to the cars. These are of 10-in. standard pipe, with ball and socket joints. These are standard fittings used in pump lines on sand and gravel dredges so they do not have to be especially made.

By swinging the lower joint of pipe every part of the car may be filled so that the load is evenly piled over the trucks.

This arrangement is in use at the new crushing plant of the Missouri Portland Cement Co. at Sugar Creek, which is about 12 miles from Kansas City, Mo.

Hopper and spouts used to load crushed stone on cars. The lower joints of the spouts are swiveled from ball and socket joints, thus permitting the even loading of the car

Bin Doors

EVEN sand, gravel and crushed stone are sometimes stolen from bins in the big cities. In ROCK PRODUCTS, October 4, 1924, we described bin doors, which could be locked, at the plant of the Boston Trap Rock Co., Boston, Mass. Herewith are two views of similar doors for shutting off access to the loading bins of the Acme Gravel Co., San Francisco, Calif.

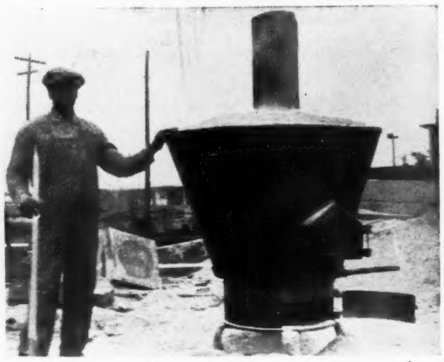
The doors are double-hinged and held open by counterweights. To close them the watchman reaches up with a hook and pulls the door down as shown in one of the views. There does not appear to be any provision for locking the doors, when down, but perhaps the mere appearance of the bins with the doors down is enough to discourage pilferers.

Stove for Drying Aggregate

WHERE small quantities of dried material are needed for any purpose the device shown here ought to work well. It consists of an ordinary coal stove surrounded with a sheet iron cone. The illustration shows it in use at the plant of the Jacksonvile Concrete Co., Jacksonville, Fla., where it is used to dry a soft limestone before grinding.

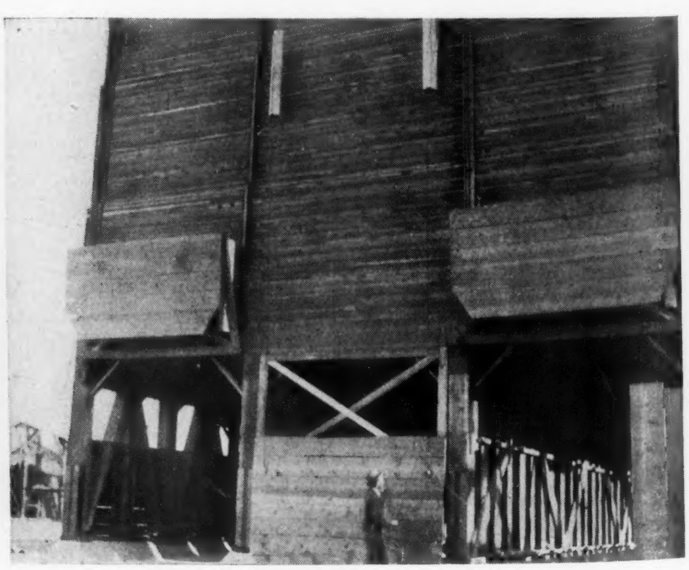
The bottom of the cone has openings at the side and as the material becomes dry it falls through these to the ground. The workman shovels it up occasionally and wheels it off in a barrow.

Before this was tried a flat plate dryer was used. This was not so satisfactory as it took more labor. In order to dry well the material had to be continually worked over with rakes and hoes. It would dry on the bottom and unless it was stirred this dried material acted as an insulator, keeping the heat from the wet material above. In the stove with the cone around it the dry material falls through and out of the device altogether so that fresh wet material is brought in contact with the stove.



Stove for drying aggregate

Pulling down the bin door



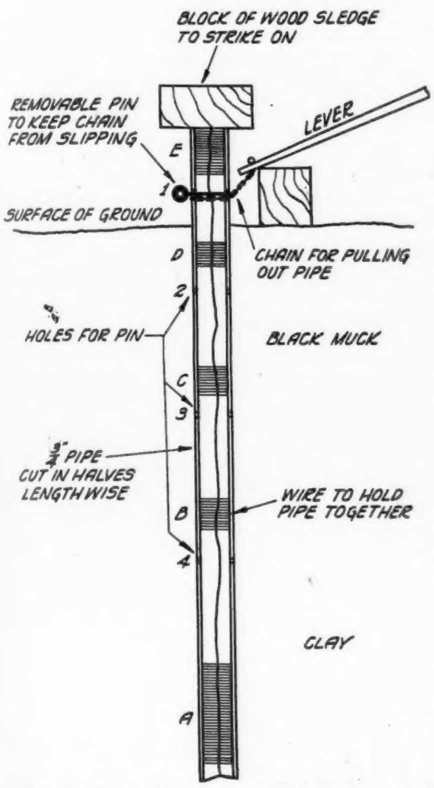
Bin door closed

Prospecting for Clay or Sand at Shallow Depths

By H. N. KIRK
Keene, N. H.

I ENCLOSE my idea of a pipe for prospecting through surface soil for clay beds or sand near the surface.

It consists of a ¾-in. pipe cut in half lengthwise, say 5 ft. in length. The more waves in the sawing of the pipe



Method used to prospect for clay and sand at shallow depths

the better it will help to keep the two halves lined up.

The end of the pipe which is to enter the ground should be filed to be somewhat sharp on outer edge. The two halves are then wired together at (*a*), (*b*), (*c*) and (*d*).

Quarter-inch holes should be bored at (1), (2), (3) and (4); these holes are to be used to put through a $\frac{3}{16}$-in. pin 4 in. long, to keep the chain from slipping off the pipe when you use the lever to pull the pipe from the ground.

When driving the pipe a hardwood block is held on the end of pipe to act as a go between the pipe and sledge.

When the pipe is to be pulled the pin is inserted into the hole (1) and chain hitched below it. The lever is then operated, the fulcrum being raised as needed until hole (2) is exposed. The pin is then placed in (2), chain hitched below it and the above process repeated until the pipe is removed.

Wires are then cut and pipe opened up giving you a core of the make-up of the ground for depth driven. No great depth can be driven into clay by this means, but it ascertains for you whether there is clay or sand near the surface without digging a hole by means of a shovel which very likely would be a wet unpleasant job and would take more time.

Pumping Marl

SUPPLEMENTING the article in ROCK PRODUCTS, February 20, p. 64, "Compressed Air Drives Marl Two Miles," F. E. Dodge, chief engineer, Cowham Engineering Co., Chicago, designers and builders of the Peninsular Portland Cement Co., Cement City, Mich., gives us the following data as to the capacity 12-in. spiral riveted steel main and the compressed-air pumping system: "A four-months average was 49.8 cu. yd. per hr., with a moisture content of approximately 60%."

A hydraulic engineer with much experience in dredging, Pierce J. McAuliffe, New York City, contributes the following:

"I have been very much interested in this particular plant. Of course the output obtained per hour was the crux of the entire situation. I note that the plant delivered approximately 50 cu. yd. per hour. Considering the length of pipe line, this is good performance providing it was not being compared with the output expected from an hydraulic dredge also discharging through 12-in. pipe line. A capacity of 49.8 cu. yd. per hour with moisture contents of 60%, gives about 125 cu. yd. per hour of mixture of water and solids. This is about 422 g.p.m., a capacity which could have been taken care of easily by a 4-in. dredging pump. It is rather surprising, therefore, to learn from Mr. Paul's article in your February 20, 1926, issue, that pump manufacturers were reluctant to figure on this installation. So long as material will flow, a centrifugal dredging pump should be able to handle it. Basing calculations on the statement that a 75-hp. motor furnishes the power for transporting this marl, a distance of 4400 ft. to an elevation of 30 ft., with initial pressure varying between 75 and 90 lb., I get an efficiency for the transporting plant of not more than 30%, which is easily bettered with a dredging pump.

"I suspect that the reluctance of pump manufacturers in quoting or guaranteeing an installation of this kind, was due to lack of experience in the friction which would be set up in the pipe line.

"So far as I am concerned, one of the most interesting points in connection with the article, is the low velocity at which the material could be transported. From the figures above the velocity of discharge appears to be about 1.2 ft. per second, while the friction per 100 ft. of pipe appears to vary from 3.0 to 3.8 ft.

The tables published by "The Hydraulic Society" indicate a friction head of 0.0785 ft. for clear water at this velocity. If the flow through the pipeline was at uniform velocity the friction set up by this 40%-60% mixture was 38 to 45 times greater than clear water friction. If the flow through the pipe was a series of pulsations, then my figures for velocity head would have to be changed to correspond.

Using the Quarry Floor for Stone Storage

THE season is at hand when quarry operators are beginning to accumulate stocks of stone against the peak demands of summer and fall. Room for stock piles is scarce about some crushing plants. The view herewith shows how Superintendent Hildebrand of Fehr and O'Rourke, Reading, Penn., solved the problem.

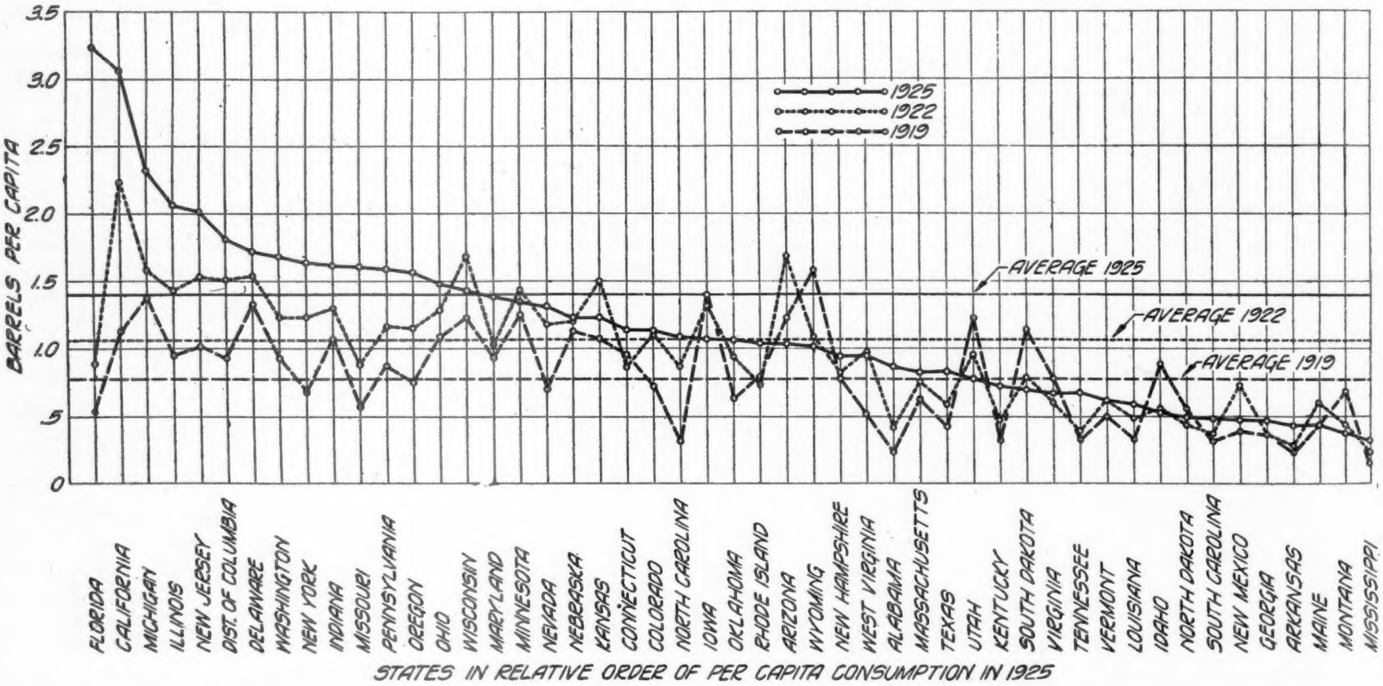
This scheme requires only the use of the plant motor trucks and a Barber-Greene Model 42 self-feeding bucket loader. The trucks are loaded at the plant bin and dump over the edge of a clean, worked-out section of the quarry. The truck loader rehandles the stone from storage. A loading time of 3 min. for a 7-ton truck, with one man at the loader, is claimed.

Clean quarry floor makes good storage space

A Study of Portland Cement Consumption

How Much More May Per Capita Consumption Be Increased?

THE start made in ROCK PRODUCTS, March 20, page 85, to study per capita consumption of portland cement has been continued with the accompanying results. Is any promoter or manufacturer safe in assuming a constantly increasing per capita consumption, based on California and Florida experience? We think not. California and Florida are two most exceptional states. In very few other states is there much evidence that per capita consumption is increasing at anywhere near the same rate, as a study of the accompanying charts easily shows.



Per capita consumption of portland cement 1919, 1922, 1925, based on U. S. Department of Commerce figures

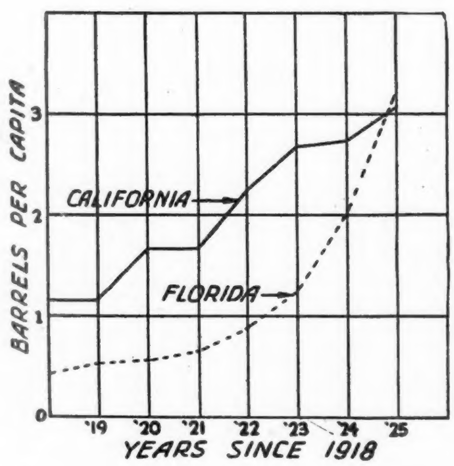
Chart 1 illustrates per capita consumption of portland cement for the years 1925, 1922 and 1919, on a descending scale based on the latest, 1925, figures. The first 14 states (including the District of Columbia) up to and including Ohio show fairly regular progressive increases in per capita consumption from year to year. In 19 of the states following Ohio per capita consumption in 1925 was greater than for any other year, but in 16 states it was less (or approximately the same as) in other years.

Wherever the full line representing per capita consumption in 1925 crosses the dotted or dash lines, per capita consumption in other years has exceeded 1925 per capita consumption. These states are readily picked out—Wisconsin, Minnesota, Kansas Iowa, Arizona, Wyoming, West Virginia, Utah, South Dakota, Virginia, Idaho, North Dakota, New Mexico, Maine and Montana. What are the peculiarities of these states and has per capita consumption reached its limit in them?

A glance shows that there are two distinct groups of states among these "backsliders," the great agricultural states of Wisconsin, Minnesota, Kansas, Iowa, North Dakota and South Dakota, and the sparsely settled mountain states of Arizona, Wyoming, Montana, Utah and Idaho. Although of different physical characters, Maine and West Virginia belong economically in the latter group, and Virginia probably in the first group.

It is obvious that the states in the first group have potential capita consumptions considerably in excess of any per capita consumption to date, but that the states in the second group—the mountain states—have had probably as high a per capita consumption as they will have for many years to come.

Charts 1 and 3 show that the per capita consumption of the various states is subject to rather violent fluctuations from year to year in about half of the states. Two obvious reasons suggest themselves to account for these fluctuations; one, such outstanding changes in economic conditions as the recent slump in agricultural profits, and second, the construction and completion of a few large engineering projects in the sparsely settled states.



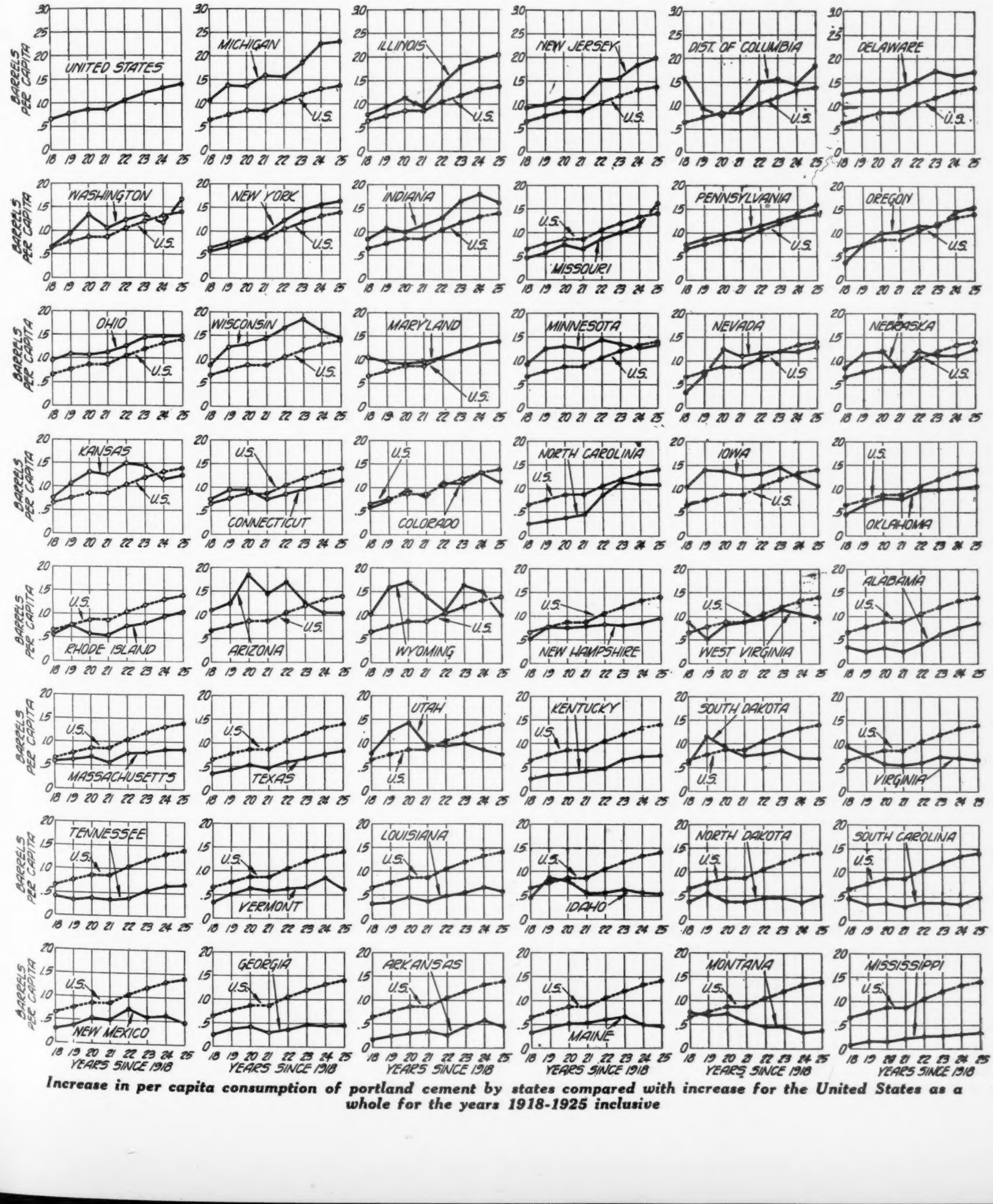
Per capita increase in consumption of portland cement in two leading states

Every state is subject in greater or less degree to fluctuations such as have taken place in Wisconsin and Iowa. Yesterday and today it is a deficiency of agricultural profits, tomorrow it may be a shortage of automobile manufacturing profits, textile manufacturing profits, or what not; but most of the big consuming states are not subject to such radical fluctuations, because, as will be seen from a glance at the 14 largest consuming states, their industries are so varied that there must be concurrent depression in

all of them to approximate conditions in Iowa, Kansas and Minnesota during the past two or three years.

Chart 3 shows the increase in per capita consumption of cement year by year from 1918 to 1925 inclusive for each of the states (except California and Florida) and for the United States as a whole. There are many interesting comparisons and contrasts in this group of charts, which could not be explained without a knowledge of conditions in each of the various states—conditions with which our readers in those states are far more familiar than we are. But we believe that some idea of the approximate future consumption of the various states may be arrived at by a study of the charts.

The increase in population for the United States from 1918 to 1925 inclusive has averaged 1.5% per year. The increase in portland cement shipments (consumption) has averaged 12½% per year in the same period. The estimated population now (115,940,000) is 110.8% of the population in 1918. The consumption of portland cement in 1925 (156,721,000 bbl.) is 222% of consumption in 1918. It is obvious that we can not expect these differentials to go on forever. Consumption of portland cement increased 23% in 1922 over 1921; 15% in 1923 over 1922; 7% in 1924 over 1923; 7% in 1925 over 1924. In other words, in spite of the tremendous growth in consumption of portland cement since 1921, it has been a steadily and consistently declining rate of growth. If the increase in consumption this year is equal to that of the past two years—7%—consumption in 1926 may be estimated at 164,800,000 bbl., with a producing capacity in excess of 200,000,000 bbl. It looks like a good time for a little caution on the part of the cement and allied industries.



Increase in per capita consumption of portland cement by states compared with increase for the United States as a whole for the years 1918-1925 inclusive

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)**	Mar. 30	100	131	133	1¾% quar. 25% ex. Dec. 1
Alpha Portland Cement Co. (preferred)**	Mar. 30	100	114	....	1½% quar. Sept. 1
Arundel Corporation (sand and gravel—new stock)	Mar. 30	No par	29¾	30½	30c quar., Apr. 1
Atlas Portland Cement Co. (common)	Mar. 30	No par	49	49⅛	50c quar.
Atlas Portland Cement Co. (preferred)	....	100	....	....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)**	Mar. 30	33⅓	43	46	2% quar. Oct. 1
Bessemer Limestone and Cement Co. (common)‡	Mar. 26	100	145	160	1½% quar. Jan. 1, 4% ex. Jan. 1
Bessemer Limestone and Cement Co. (preferred)‡	Mar. 26	100	105	108	1¾% quar. Jan. 1
Bessemer Limestone and Cement Co. (convertible 8% notes)‡	Mar. 26	....	120	135	8% annual
Boston Sand and Gravel Co. (common) (r)	Mar. 26	100	61	68	2% quar. July 1
Boston Sand and Gravel Co. (preferred) (d)	Jan. 15	....	....	80	1¾% quar. Oct. 1
Boston Sand and Gravel Co. (1st preferred) (d)	Jan. 15	....	....	90	2% quar. Oct. 1
Canada Cement Co., Ltd. (common)	Mar. 31	100	106	106¾	1½% quar. Apr. 16
Canada Cement Co., Ltd. (preferred) (f)	Mar. 25	100	115½	117	1¾% quar. Feb. 16
Canada Cement Co., Ltd. (1st 6's, 1929) (f)	Mar. 25	....	102	103	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944) (f)	Mar. 25	100	92	96	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Mar. 29	No par	22	25	50c quar. Apr. 12
Charles Warner Co. (preferred)	Mar. 29	100	101	....	1¾% quar. Apr. 22
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929 (r)	Mar. 25	100	105	106½	
Cleveland Stone Co.	Mar. 30	....	152	160	1½% quar., Mar. 1, 1% ex. Mar. 1
Connecticut Quarries Co. (1st Mortgage 7% bonds) (s)	Mar. 25	100	102¾	....	
Dolese and Shepard Co. (crushed stone) (a)	Apr. 1	50	75	78	$1.50 quar. Apr. 1
Giant Portland Cement Co. (common)**	Mar. 30	50	36	44	
Giant Portland Cement Co. (preferred)**	Mar. 30	50	44	48	3½%s.-a. Dec. 15, plus 10% arrears.
Ideal Cement Co. (common)‖	Mar. 31	No par	80	85	$1 quar. Jan. 2. 50c ex. Dec. 27
Ideal Cement Co. (preferred)‖	Mar. 26	100	107	110	1¾% quar. Jan. 2
International Cement Corporation (common)	Mar. 31	No par	59⅝	60⅞	$1 quar. Mar. 31
International Cement Corporation (preferred)**	Mar. 29	100	102	102	1¾% quar. Mar. 31
International Portland Cement Co., Ltd. (preferred)	Mar. 1	....	30	45	
Kelley Island Lime and Transport Co.	Mar. 30	100	118	123	$2 quar. Apr. 1
Lawrence Portland Cement Co.**	Mar. 30	100	110	....	2% quar.
Lehigh Portland Cement Co.‖	Mar. 30	50	88	92	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially up to 1930) (k)	Mar. 26	100	99	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially from 1930 to 1935) (k)	Mar. 26	100	97	100	
Michigan Limestone and Chemical Co. (common)‖	Mar. 26	....	24½	....	
Michigan Limestone and Chemical Co. (preferred)‖	Mar. 26	....	24½	....	
Missouri Portland Cement Co.	Mar. 30	25	49	49½	1¾% quar. Apr. 15
Monolith Portland Cement Co. (common) (c)	Mar. 26	....	10¼	10¾	50c quar. Feb. 1
Monolith Portland Cement Co. (units) (c)	Mar. 26	....	26¾	28½	
Monolith Portland Cement Co. (preferred) (c)	Mar. 26	....	8¼	8¾	
Newaygo Portland Cement Co.*	Mar. 26	....	120	....	
New Egyptian Portland Cement Co. (pref.) with common stock purchase warrants (7)	Mar. 27	100	99	102	
New England Lime Co. (Series A, preferred) (i)	Jan. 29	100	96½	99	
New England Lime Co. (Series B, preferred) (8)	Mar. 19	100	92	95	
New England Lime Co. (V.T.C.) (8)	Mar. 22	....	35	38	
New England Lime Co. (6s, 1935) (m)	Mar. 26	100	99	100	
North American Cement Corp. 6½s 1940 (with warrants)	Mar. 31	....	98	98	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common) (z)	Mar. 25	....	94	99	2 mo. period at rate of 7%
North American Cement Corp. (preferred)	Dec. 31	....	....	....	1.75 quar. Feb. 1
Pacific Portland Cement Co., Consolidated (§)	Mar. 27	100	90	93	½% mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)§	Mar. 27	....	100	100¼	3% semi-annual Oct. 15
Peerless Portland Cement Co.*	Mar. 26	10	5¾	6½	
Petoskey Portland Cement Co.*	Mar. 26	10	10	....	1½% quar.
Rockland and Rockport Lime Corp. (1st preferred) (d)	Mar. 29	100	98	98	3½% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (2nd preferred) (d)	Jan. 15	100	....	70	3% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (common) (d)	Feb. 1	No par	....	60	1½% quar. Nov. 2
Sandusky Cement Co. (common)*	Mar. 30	100	124	....	$2 quar. Apr. 1
Santa Cruz Portland Cement Co. (bonds) (§)	Mar. 27	....	105	106	6% annual
Santa Cruz Portland Cement Co. (common) (§)	Mar. 27	50	85	92	$1 quar. $1 ex. Dec. 24
Superior Portland Cement, Inc. (new stock) (6)	Feb. 26	....	44	44½	
United States Gypsum Co. (common)	Mar. 31	20	129½	129⅞	2% quar. Mar. 31,
United States Gypsum Co. (preferred)	Mar. 31	100	114	117	1¾% quar. Mar. 31
Universal Gypsum Co. (common)†	Apr. 1	No par	17	18	
Universal Gypsum V. T. C.†	Apr. 1	No par	16	17	
Universal Gypsum Co. (preferred)†	Aug. 5	....	76	....	1¾% quar. Sept. 15
Universal Gypsum Co. (1st mortgage 7% bonds)†	Apr. 1	....	99	(at 6¼%)	
Union Rock Co. (7% serial gold bonds) (y)	Mar. 26	100	99	101	
Wabash Portland Cement Co.*	Aug. 3	50	60	100	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940) (o)	Feb. 25	100	98½	100	
Wolverine Portland Cement Co.	Mar. 31	10	6¾	6¾	2% quar. Aug. 15

*Quotations by Watling, Lerchen & Co., Detroit, Mich. **Quotations by Bristol & Willett, New York. †Quotations by True, Webber & Co., Chicago. ‡Quotations by Butler, Beadling & Co., Youngstown, Ohio. §Quotation by Freeman. Smith & Camp Co., San Francisco, Calif. ‖Quotations by Frederic H. Hatch & Co., New York. (a) Quotations by F. M. Zeiler & Co., Chicago, Ill. (b) Quotations by De Fremery & Co., San Francisco, Calif. (c) Quotations by A. E. White Co., San Francisco, Calif. (d) Quotations by Lee, Higginson & Co., Boston, Mass. (f) Nesbitt, Thomson & Co., Montreal, Canada. (i) E. B. Merritt & Co., Inc., Bridgeport, Conn. (k) Peters Trust Co., Omaha, Neb. (m) Second Ward Securities Co., Milwaukee, Wis. (o) Central Trust Co. of Illinois, Chicago. (r) J. S. Wilson Jr. Co., Baltimore, Md. (s) Chas. W. Scranton & Co., New Haven, Conn. (y) Dean, Witter & Co., Los Angeles, Calif. (z) Hemphill, Noyes & Co., New York. (6) Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. (7) Baker, Simonds & Co., Inc., New York. (8) William C. Simons, Inc., Springfield, Mass.

QUOTATIONS ON INACTIVE ROCK PRODUCTS CORPORATION SECURITIES ON PAGE 70

Editorial Comment

Good and Poor Concrete Aggregates

Some question has been raised as to the point of our editorial in the March 6 issue on "Uniformity and Workability of Concrete." Apparently the points in question are in the following quotation: "Where it is most economical to apply workmanship—in the preparation of the aggregates or in the preparation of the concrete—is not yet settled, but it would seem . . . that poor concrete is just as often caused by faulty manipulation and workmanship of good aggregates as it is by poor aggregates."

Possibly the word "preparation" was misunderstood. What was in mind was the grading and mixing of various sizes to accurately produce a determined fineness modulus, or something of the kind. It should go without saying that aggregates containing unsound material, organic matter or deleterious minerals should never be used, and sufficient preparation to remove these should always be given. Of course, every one knows that the essentials of first-class concrete are first-class materials; first-class workmanship in mixing and placing (manipulation), and first-class workmanship in curing. But all concrete does not, for reasons of economy, have to be first class, and variables are always present in the three essential elements involved on any job.

"The best of workmanship cannot make up for the use of poor aggregates, and the best of aggregates cannot make up for faulty mixing and placing," writes a correspondent. Exactly—that is the point we were trying to make—with both quality of materials and workmanship variable, there is more confusion as to the relative value of good and poor materials than would otherwise exist. And granting that on nearly all jobs one or more of these variables exist, it would seem that workmanship in mixing and placing concrete was fully as much responsible for poor concrete as the character of the aggregates used, or vice-versa.

Constructors have obtained reliable results with relatively poor materials in one case by good workmanship, and failed elsewhere with similar materials and faulty workmanship; but they have been unable, because of lack of methods of control of workmanship, to differentiate clearly between unsatisfactory results caused by poor aggregates and those caused by too short a period of mixing, too much water, etc.

Rock Products was the first, and for many years practically the only, advocate of properly prepared commercial aggregates. We shall never take any other stand, but we do not intend to hide our heads in a hole in the ground to escape meeting conditions as they exist today, nor, if we can help, allow our readers to.

The editorial was intended to interest aggregate producers in the results obtained with their materials; for what inducement is there to manufacture a perfectly graded aggregate at high cost if it is going to be mixed with two or three times as much water as required for the best results, or given a half-minute mix when two or three minutes should be the minimum? The result will be unsatisfactory and the aggregate is hardly likely to be appreciated. Hence, the aggregate producer should take just as active an interest in how his material is used, as he should in knowing how to produce it according to specifications; otherwise much of the money and effort placed in perfecting his product is lost, for results are ultimately judged not by how near the specifications his material was, but by the appearance, success, and economy of the structure in which it is incorporated.

The Severance Tax Problem

At the Memphis meeting of the American Mining Congress, no subject was more earnestly discussed than the "severance" or "separation" tax, as it is variously termed. This is a tax levied on minerals and collected at the point of production. A number of states levy the severance tax on a few products and a few states levy the tax on almost all natural products. Except in these few states (Louisiana and Arkansas are examples) severance taxes have not affected the rock products industries particularly. But with legislatures hunting everywhere for new things to tax and new ways of levying taxes, it is not to be supposed that this will continue.

The theory on which the severance tax is based (and the tax has been upheld by the Supreme Court of the United States) is that the industries which should pay it are taking from the state natural resources which are irreplaceable, and hence lowering the real value of the state to that extent. The theory is wrong, so far as ordinary rock-product minerals are concerned. To take a simple product for illustration, sand and gravel in the bank have no value except as they can be taken out and made ready to use for concrete aggregate, in wall plaster and as molding sands. Not only the man who takes them out makes a profit by their extraction but the man who uses them; otherwise he would not buy them. The real property value of the state is increased and not diminished when sand and gravel is taken from the ground and made into buildings, bridges and highways. Hence any severance tax is unfair if it is levied on the theory that the producer is doing damage to the state for which he should pay. This reasoning applies with equal force to all rock products, which in general are not removed out of the state, but are incorporated in permanent structures within the state.

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price bid	Price asked	Divided rate
Coplay Cement Mfg. Co. (common) (4)	Dec. 16	....	12½	....	
Coplay Cement Mfg. Co. (preferred) (1)	Dec. 30	....	70	....	
Eastern Brick Corp. 7% cu. pfd.) (1)	Dec. 9	10	40c	....	
Eastern Brick Corp. (sand lime brick) (common) (1)	Dec. 9	10	40c	....	
Edison Portland Cement Co. (common)	Nov. 3	50	7½c(x)	....	
Iroquois Sand & Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.) (1)	Mar. 17	....	$12 for the lot	....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	....	
Lime and Stone Products Co. (1100 sh. pfd., $10 par and 700 sh. com., $10 par)	Feb. 10	....	$66 for the lot	....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co. (g)	Oct. 13	....	....	£1⅝	
Phosphate Mining Co. (1)	Nov. 25	....	1@5	....	
Pittsfield Lime and Stone Co. (preferred)	....	100	....	....	2% quar. Apr. 1
Rock Plaster Corp. (390 sh. com., no par) (1)	Mar. 17	....	$12 for the lot	....	
Simbroco Stone Co. (pfd.)	Dec. 12	....	....	....	$2 Jan. 1
Tidewater Portland Cement Co. (common) (3)	Nov. 25	....	8½	....	
Vermont Milling Products Co. (slate granules) 5 sh. pfd. and 1 sh. com. (2)	Dec. 30	....	$1 for the lot	....	
Winchester Brick Co. (preferred) (sand lime brick) (5)	Dec. 16	....	10c	....	

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day and Co., Boston. (3) Price obtained at auction by Weilepp-Bruton and Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925.

Arundel Corporation Annual Report

THE following is the annual report of the Arundel Corp., Baltimore, Md., and includes a comparative statement of earnings for 1923-1925 inclusive:

	1925.	1924.	1923.
Net income	$1,567,032	$1,220,971	$834,862
Provisions for federal taxes	194,048	157,447	108,061
Preferred dividends	....	23,363	68,250
Common dividends	884,722	589,691	393,077
Balance, surplus	$ 488,262	$ 450,470	$265,474

COMPARATIVE BALANCE SHEET, DEC. 31.

ASSETS

	1925	1924
Land, bldgs., machin., eq., etc.	*$4,309,981	$4,324,920
Investments	356,103	66,816
Cash	526,622	1,086,397
Accts. receivable	1,211,711	967,771
Notes receivable	43,648	9,545
Notes rec. from affil. corp.	....	41,253
Market securs.	514,580	....
Sundry debtors	15,035	6,137
Accrued int. receiv.	....	67,776
Material and suppl.	13,064	18,256
Deferred charges	37,306	29,639
Total	$7,028,050	$6,618,511

LIABILITIES

	1925	1924
7% pref. stock	....	†
Common stock	‡$4,915,556	$4,915,556
Accounts payable	305,905	518,440
Notes payable	25,000	25,000
Federal taxes	194,048	157,447
Dividends payable	442,363	294,858
Accrued expenses	5,323	5,832
Reserve for insur.	68,804	67,776
Surplus	1,071,050	633,602
Total	$7,028,050	$6,618,511

*After deducting $2,012,004 reserve for depreciation. †Retired June 30, 1924. ‡Shares of no par value whereof 495,426 shares issued for $4,954,260 less 3870.4 shares re-acquired and held in the treasury $38,704.

—*Financial Chronicle.*

North American Additional Bond Listing

THE New York Stock Exchange has authorized the listing of $1,650,000 additional sinking fund gold debentures, series A, 6½%, due September 1, 1940, of the North American Cement Corp., Albany, N. Y. Proceeds from the sale of these additional series A debentures have been used to pay, in part, for the properties and assets of Acme Cement Corp. and $250,000 thereof has been set aside with the trustee to provide funds for the improvements now being made on the properties acquired. $501,236 7% serial notes of Acme Corp. were delivered to the company for cancellation.

—*Financial Chronicle.*

CONSOLIDATED INCOME STATEMENT FOR THE YEAR ENDED DECEMBER 31, 1925
(After giving effect to the earnings of predecessor companies and of the Acme Cement Corporation)

	North American	Acme	Total
Sales, net of returns and allowances and discount	$4,526,951	$1,627,633	$6,154,584
Cost of sales	2,241,731	1,090,262	3,331,993
Selling, general and administration expense	604,098	234,308	838,406
Operating profit	$1,681,123	$303,062	$1,984,185
Miscellaneous income, net	46,440	4,246	50,687
Net income	$1,727,563	$307,308	$2,034,872
Depreciation and depletion	356,098	85,966	442,065
Amortization of discount on bonds	40,083	....	40,083
	$396,181	$85,966	$482,147
Net income available for federal taxes, interest and dividends	$1,331,382	$221.342	$1.552,724

International Cement Earnings

THE following figures show the comparative earnings in quarters for 1925 ending December 31 of the International Cement Corp:

	Quarters Ended: Dec. 31, 1925	Sept. 30, 1925	June 30,1925	Mar. 31, 1925
Gross sales	$5,161,695	$7,163,528	$5,452,302	$3,782,201
Packages, discounts and allowances	970,057	1,349,332	990,663	650,576
Manufacturing costs	2,123,832	2,891,585	2,126,799	1,509,353
Depreciation	287,076	328,131	270,406	171,355
Shipping, selling, and adminis. exp.	944,364	946,158	737,951	573,434
Net profit	$ 836,365	$1,648,322	$1,326,482	$ 877,484
Miscellaneous income	113,865	6,456	5,150	8,013
Total income	$ 950,229	$1,654,778	$1,331,632	$ 885,497
Reserve for fed. taxes and contingencies	157,082	301,879	221,029	171,558
Net to surplus	$ 793,147	$1,352,898	$1,110,603	$ 713,939

From the above it will be noted that the net to surplus for the fourth quarter is $793,147, which makes a total for the year of $3,970,587 after Federal income taxes, reserves, and all other charges, as compared with the 1924 net of $3,047,507. After allowing for dividends on the preferred stock, these earnings are equivalent to approximately $7.02 per share on the 500,000 common shares outstanding at December 31, 1925. This report is made before receiving the final report for the year from the auditors.—*Financial Chronicle.*

Universal Gypsum Balance Sheet

PROFIT and loss surplus of the Universal Gypsum Co., Chicago, at the end of 1925 was $1,682,369, according to the balance sheet, as compared with $1,504,522 on December 31, 1924. Current assets as of December 31 last, were $1,147,778, against current liabilities of $283,676, as compared with current assets of $737,714 and current liabilities of $270,984.—*The Economist.*

Whitehall Cement Bonds Called

ALL of the outstanding 5% first mortgage gold bonds of the Whitehall Cement Manufacturing Co., Cementon, Penn., dated April 5, 1911, have been called for payment May 1 at 105 and interest at the Fidelity Trust Co., trustee, Philadelphia, Penn.

Holders of the bonds desiring to present them to the trustee for payment and redemption prior to May 1 may do so. Bonds so presented will be redeemed at 105 and interest to date of presentation.

Dividends Declared

(All dividends paid quarterly unless otherwise noted)

	Rate	Payable
Dolese & Shepard Co.	$1.50	April 1
Canada Cement Co. com.	1½%	April 16
U. S. Gypsum Co. com.	40c	March 31
U. S. Gypsum Co. pfd.	1¾%	March 31
International Cement Co. com.	1.00	March 31
International Cement Co. pfd.	1¾%	March 31
Arundel Corp.	30c	April 1
Kelley Island Lime and Transport Co.	2.00	April 1
Mich. Limestone and Chemical Co. pfd.	1¾%	April 15
Sandusky Cement	2.00	April 1
Charles Warner Co. com.	50c	April 12
Charles Warner Co. pfd.	1¾%	April 22

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

A Cement Product That Has Great Possibilities

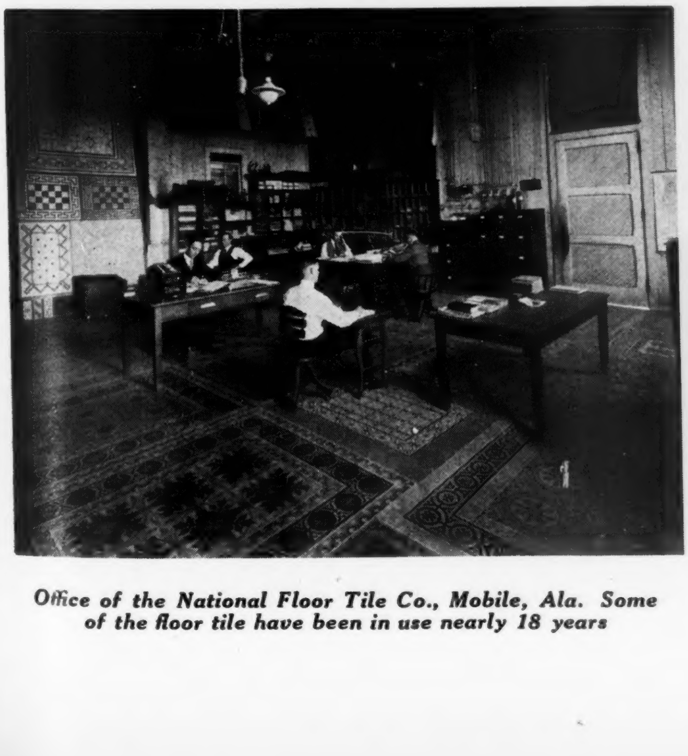
National Floor Tile Company, Mobile, Alabama, Produces Beautifully Colored Effects in Mosaic Tile

THE MAKING of mosaic floor tile is not an industry which uses large tonnages of cement and aggregate so its interest to ROCK PRODUCTS readers is that it emphasizes the amazing possibilities that lie in making cement products. The product of the National Mosaic Floor Tile Co., of Mobile, Ala., has been sold all over the United States and it is probable that most of the readers of this paper have walked on floors of this tile without even suspecting that it was a cement product. We connect the word cement with various shades of gray, but these tile are brilliant with reds, blues, yellows, and greens, some in bright colors and some in soft pastel shades. There is no color that cannot be obtained by the process used except an absolutely pure white. But, at that, the white that is produced is so nearly a pure white that the ordinary observer cannot tell the difference.

"Adamantile" floor and border made in four colors

This is one branch of the cement products industry that Americans neither invented nor developed. It originated in Spain and it was brought to this country by Spaniards about 20 years ago. Almost all the workmen employed are Spaniards and the tools and materials are all called by their Spanish names in the factory. The notices to the workmen posted on the factory bulletin board are in Spanish and English.

The Spaniards who brought over the industry could make excellent floor tiles, but they were not acquainted with American methods of marketing a new product. Consequently, they met with little success in their new venture. An American company took over the business and it has prospered exceedingly since the tile were properly introduced and the business firmly established. The trade name "Adamantile" was given to the product and under that name it is fa-



Office of the National Floor Tile Co., Mobile, Ala. Some of the floor tile have been in use nearly 18 years

Interior of a residence in Mobile showing how cement floor tile may be used in the home

miliar to architects and builders everywhere.

The process of making the tiles is simple enough and the only machine employed is a simple hydraulic press capable of giving 4500 lb. per square inch pressure to the tile. A number of these presses are in use and each is connected to a system of water pipes, laid below the floor through which water under pressure is pumped. The presses were made in Spain especially for the work, and they have to be very strong as the pressure on an 8x8-in. tile is 36,000 lb.

The mold is of heavy cast iron, square, and in two pieces which are held together by bolts passing through lugs in the corners. One of them shows at the left of the press in the foreground of the large picture. This mold is laid on a smooth block of steel on which the face of the tile is to be cast. The workman takes a small scoop like a sugar scoop except that it is brought to a point at the end and dips it into the colored facing mixture. He spreads this in the mold to a depth of about ¼ in. On top of this he puts dry standard portland cement to about the same depth and follows this with the backing mixture of sand and cement. The mold is then scraped with a steel tool which leaves the tile at just the right thickness and pushed under the press. The platen of the press is forced into the mold and allowed to stay there for a few seconds and then it is raised and the tile taken out. It is surprisingly firm and hard in this green state. The workman in the picture is holding a green tile on his hand. The tile are placed on pallets like those shown at the left of the workman and allowed to set. Later they are taken from the pallets and placed in great concrete troughs filled with water, where they remain until they are thoroughly hardened. It takes about three weeks for the tile to harden sufficiently to

Plant of the National Floor Tile Co., Mobile, Ala.

Tile manufacturing room. The mold used is shown at the left and the press is directly behind the workman in the foreground

Floor tile are carefully packed for shipment

The mixing room. Hand mixing has been found better than machine mixing as the colors "dust out" less

One of the numerous working places with its press and receptacles for colored mortars

be shipped.

The facing mixture is made of white cement, finely ground silica sand (which must be pure white), and as much mineral coloring as is needed to give the desired shade of color. Either Atlas or Medusa white cement is used. A French cement was formerly used, but American cements are found to give as good results and they harden more rapidly. It took 60 days for the French cement to come to the same hardness that American cements acquire in 21 days. The colors are ordinary dry concrete pigments bought in the open market with the exception of some special colors which are imported. Any standard brand of portland cement will do for the middle layer. The backing mixture is ordinary river sand bought from a local producer. It is about what is called plastering sand—that is, 1/10-in. and finer.

H. C. Sackhoff, manager of the National Floor Tile Co.

The description is that of making a plain tile. For pattern tiles the workman uses a *dibujo*. This *dibujo* (a Spanish word that means a design or drawing), is a square of thin brass strips that just fits into the mold. In this square the design is made with other strips of brass bent to the proper shape and brazed together. The work is all done at the plant. The spaces in the design are the spaces between the brass strips. In making a pattern tile the workman first puts the *dibujo* in the mold and lays it on the steel plate and then he fills each space of the design with a facing mixture of the proper color, using a small scoop with a narrow point. A different scoop is used for each color. Then, when all the spaces are filled to the right depth, the *dibujo* is lifted, leaving the pattern in a mosaic of colors. The backing up with dry cement and cement and sand is the same as for the plain tile.

The tile are smooth enough so that no treatment is needed to prepare them for the floor, but in some instances a highly polished floor is required and the tile for this are polished on an ordinary marble polishing machine.

These tile are almost indestructible. In the company's office are tile that have been laid for 18 years and have been constantly walked upon, but they show no sign of wear. The only care given them is to wax them with a thin floor wax. They are waterproof and in time become grease proof as well.

One of their advantages over other kinds of tile is their trueness to shape and dimensions. They can be laid with an almost invisible joint, while other kinds of tile cannot be laid so closely on account of variations in size and shape.

The tile are made in 4x4, 6x6, and 8x8-in. sizes, with half tile and triangles to match. They are used not only for floors, but for wainscoting. Of late they have been in heavy demand for the floors of houses built in the Spanish style, for in Spanish countries this tile is used almost to the exclusion of other flooring materials. A fair proportion of the Mobile factory's output is exported.

The office of the company is at the plant. W. D. Bellingrath is president of the company, and H. C. Sackhoff is secretary-treasurer. B. Castro is the factory superintendent.

Unusual Concrete Construction

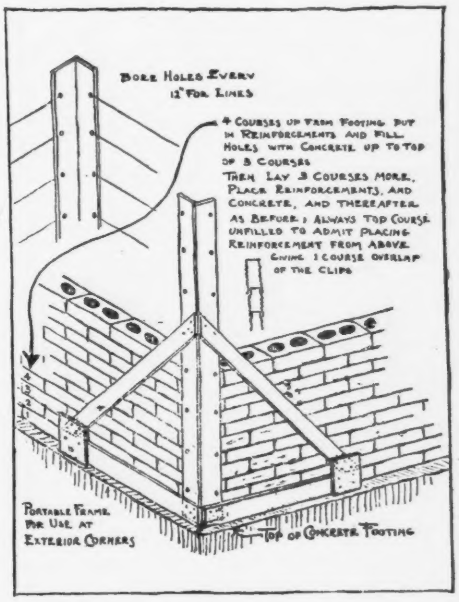
A NEW type of concrete construction, different from any heretofore known, has made its initial appearance in the American building industry.

The new idea is known as "Stockade," which is not only the name of a patented building material, but is the name of a building system as well. The "Stockade" material is a large building block, or mold, eight times the size of and having the same proportions as a common brick. It is manufactured under patented processes out of the fibers of such vegetable growths as palmetto and saw grass.

The finished block is light (weighing 4 lb.), very compact, and strong. It is said to be moisture proof, highly resistant to fire, and a non-conductor of sound and heat. The block has two holes through it in a vertical direction. When a number of the blocks are laid up into a wall, like bricks except that no mortar is used between them, these holes fit over one another. Every three courses, steel clips are inserted down through the holes, and they are then filled with concrete.

The resulting wall is actually a wall of concrete pillars 4½ in. thick and 3½ in. apart, protected and hidden in the center of 8 in. of fibrous material. The strength of the wall made in this fashion has been found, by tests at the Massachusetts Institute of Technology, to be 19,000 lb. per running foot. The compressive strength of the "Stockade" blocks, which is about 100 lb. per sq. in. is not included in this.

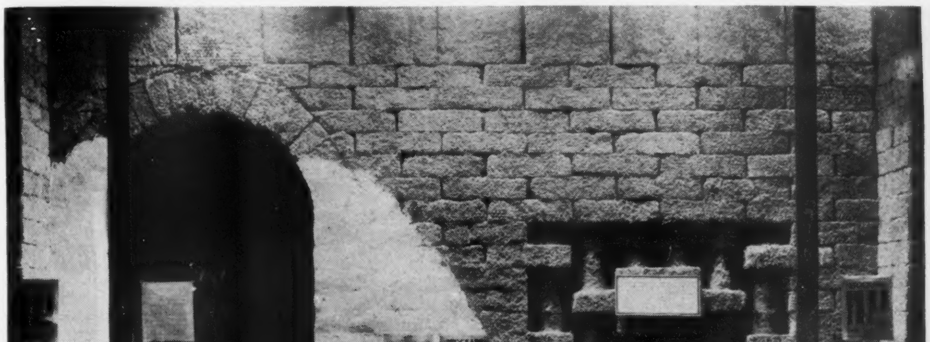
The surface is fibrous and non-rigid, of-



Method of laying a "Stockade" wall

fering a key for stucco and plaster of which very thin coats of these are said to suffice. The outside of the wall may be finished either in brick, shingle, stucco, or clapboard. The blocks are dense and hold nails.

"Stockade" is now being manufactured in New York, Boston and Baltimore. New



Part of a "Stockade" wall with section removed to show the concrete pillars embedded in the molds. Part of the doorway has been treated with a thin coat of stucco or plaster

plants are starting in Florida and Chicago, Long Island, central New York, and Westchester county. Many houses have been built of it, and out of the experience of these actual constructions are taken the costs of the "Stockade" system. It is said to figure at $632.50 for each 1000 sq. ft. of laid-up wall surface.

James Monroe Hewlett, a former president of the Architectural League and a director and fellow of the American Institute of Architects, is the inventor of the new material and the new system.

Ohio Crushed Stone Association Holds Macadam Road School

THE Ohio Crushed Stone Association has opened its campaign for the building of the bituminous macadam type of pavements.

Following is a report from *Better Highways*, published by the Association at Columbus:

Better roads and schools go together. Both build communities. Both help to make land values.

This was the main thought of the Macadam Road school, held at Columbus, Ohio, March 11, 1926.

The program was prepared by the Ohio Crushed Stone Association. One hundred and sixty attended the school and banquet.

A. T. Goldbeck of Washington, D. C., one of America's noted engineers and road builders, lectured. For years, Mr. Goldbeck was the U. S. Government man who tested road materials. He is now chief engineer of the National Crushed Stone Association.

State Highway Director George F. Schlesinger delivered a lecture which he had given a few days before at Michigan road meeting, and which was strongly commended by our neighbor state road officials.

Otho M. Graves, Pennsylvania, president, National Crushed Stone Association, former college instructor and eminent engineer, spoke both at school session and evening banquet.

Carl L. Van Voorhis, former county engineer, and secretary of the Ohio State Engineering Society, was on program afternoon and evening.

Charles McIntire, well known lecturer and good road advocate, spoke in favor of a state tax levy, to get money to match federal aid funds.

President Frank E. Harrison of the Ohio Good Roads Federation told of some of the important road problems which must be solved.

Dr. Wm. H. Guyer, president of Findlay college, is one of the most pleasing after dinner speakers in Ohio. His wit, wisdom and way of saying things delights and instructs all who hear him.

Hon. John A. McDowell, superintendent of Ashland schools and president of the Ohio State Teachers' Association, brought a message of common sense and information which claimed the closest attention of all present. His talk was well seasoned with salt and pepper. Being a farm owner, he spoke for the tax payer's side of road building. He commended the splendid macadam roads, over which he had traveled in eastern states.

Senator Hempel, chairman of the Ohio joint legislative road committee, made brief but timely remarks. He is an engineer and has built some of the good macadam roads in eastern Ohio.

Mr. Fawcett of the state highway department stated that the location of roads to be improved was one of the big and important problems of the highway game. His remarks fit the occasion.

The veteran engineer and road builder and Ohio's first deputy highway director, D. W. Seitz, Putnam county, was introduced and roundly applauded.

Newaygo Portland Cement Company Rewards Old Employes With Gold Watches

NEARLY 200 employes and guests of the Newaygo Portland Cement Co. were entertained at the recent tenth annual banquet of the company. J. B. John, president and general manager of the company, spoke briefly, outlining the plans and aims of the company for the coming year, and then sprang a surprise by presenting W. A. Ansorge, John Markert, Ralph Evans, and George Monroe, all veteran employes, with elegant watches as a token of the esteem in which they are held by their employers. The watches were handsomely engraved with a record of each man's service, and Mr. John announced that each employe attaining a service record of 25 years would be presented with a similar gift.

Following Mr. John, W. A. Ansorge gave an interesting account of the early years of the company history, and W. J. Bell, first superintendent, spoke on his 34 years of experience in the cement industry. An excellent program provided by local and outside entertainers rounded out the evening's enjoyment.—*Newaygo (Mich.) Republican.*

Mine Rescue Contest for 1926

THE Fifth International First-Aid and Mine-Rescue Contest will be held at San Francisco, Calif., during the first week of September, 1926, under the auspices of the Bureau of Mines, Department of Commerce. The date and place of the contest, which is open to all miners, quarrymen and workers in metallurgical plants and the petroleum and natural gas industries, has been approved by the Secretary of Commerce, following an invitation received from the Society of Safety Engineers of California. The city of San Francisco has expressed its interest in the event by donating the use of the Civic Auditorium for the First-Aid Contest. The University of California has made available the use of the Greek Theater for the Mine-Rescue Contest.

The International First-Aid and Mine-Rescue contests are held annually under the auspices of the Bureau of Mines, with the cooperation of the American National Red Cross, the National Safety Council, and various mine operators' associations and miners' organizations, with the object of furthering the work of training miners in first-aid and mine-rescue methods, and the consequent advancement of the cause of safety among the million miners of the United States.

The first-aid and mine-rescue contests will be for international championships, and international contest cups, medals and prizes will be awarded to the winner. Proficiency of contesting teams will be determined in accordance with Bureau of Mines' standards by judges thoroughly familiar with first aid and mine rescue work.

A feature of the meet will be the awarding of the Congressional medal which is given annually to the team of miners adjudged to be most thoroughly skilled in first-aid and mine-rescue methods.

Another interesting feature of the meet will be the awarding of the medals offered annually by the Joseph A. Holmes Safety Association in commemoration of notable deeds of heroism performed by miners in succoring their comrades in time of peril.

Approximately 160,000 miners have already been trained in first-aid-to-the-injured and mine-rescue methods by the Bureau of Mines, and this event promises to be an important step toward the promotion of safety and efficiency in mining. A large attendance of miners is expected at the contest in San Francisco, and it is anticipated that many prominent representatives of the mining industry, who have taken a keen interest in industrial safety, will be present.

All organizations interested in the contest are invited to enter one or more first-aid and mine-rescue teams. Entry blanks, together with the general rules of the contest, can be obtained from the experiment station of the Bureau of Mines, 4800 Forbes street, Pittsburgh, Penn.

President of du Pont Company Retires

THE directors of E. I. du Pont de Nemours and Co., Wilmington, Del., recently elected Lammot du Pont as president of the company to succeed Irenee du Pont, who desired to be released from the duties of the office so that he might devote more of his time to personal affairs.

The retiring president was made vice-chairman of the board of directors and chairman of the finance committee. He retired from the executive committee and the new president was made its chairman.

Lammot du Pont is the eighth member of the du Pont family to head the company since the business was founded in 1802 and the third brother to hold the presidency in succession. Pierre S. du Pont, the first of this trio, was at the helm from 1915 to 1919, during the period of the World War, when the bulk of munitions production for the allies fell to the company's lot. He was succeeded by Irenee, who, as senior vice-president, had been importantly identified with the war period work as was Lammot, also a vice-president and member of the executive committee, which directed every step in the vast construction and production work of that time.

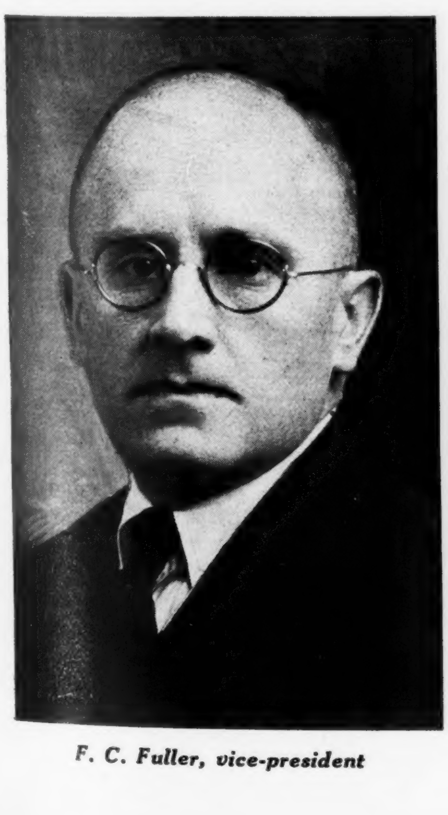
Ohio Sand and Gravel Producers Association Elects Officers

THE Ohio Sand and Gravel Producers Association recently held a meeting at Columbus, Ohio. Great interest was displayed by the members, for there was nearly 100% attendance.

Earl Zimmerman, president

Interesting talks were given by Geo. F. Schlessinger, state highway director of Ohio; H. J. Kirk, chief engineer, highway department of Ohio; R. J. Stimson, chief engineer, city of Columbus, Ohio, and C. Lattimer, county surveyor of Franklin County, Ohio.

The following were elected officers and directors for 1926:



F. C. Fuller, vice-president

Earl Zimmerman of the Ohio Gravel Ballast Co., Cincinnati, Ohio, president; F. C. Fuller, Portsmouth Sand and Gravel Co., Portsmouth, Ohio, vice-president; Stephen Stephanian, Arrow Sand and Gravel Co., Columbus, Ohio, secretary-treasurer, and Guy C. Baker, the Greenville Gravel Corp., Greenville, Ohio, executive secretary. K. K. Kutz, Massillon; J. T. Adams, Columbus; R. A. Ault, Piketon; R. E. Doville, Toledo, and L. K. Warner, Marion, directors.

Fireproofness of Sand-Lime Brick Demonstrated

A RECENT disastrous fire in the heart of the business section of Dayton, Ohio, brought out excellent proof of the fireproof qualities of sand-lime brick. The building which shows in the foreground was built some four or five years ago and partially faced with sand-lime brick furnished by the Crume Brick Co., of Dayton. During the fire it was subjected to intense heat, some of the flames reaching up to the tenth floor. As is evident from its appearance, the retaining walls remained intact and suffered little or no damage in contrast to the complete failure of the structures close by.

On inspection of the condition of the sand-lime brick in the walls and stair tower of the building, after the fire, was made by the inspection department of the city of Dayton. Gustave A. Niehaus, chief inspector, in reporting his findings, said:

"We are pleased to note that the sand-lime brick are in perfect condition, although exposed to a terrific fire and heat for over 2½ hours, whereas, other walls crumbled and fell.

"This proves to us that these brick are especially suited for fire walls where intense fires may prevail and be intact and in good condition after the fire."

Good evidence of the fireproof qualities of sand-lime brick was demonstrated during a recent fire at Dayton, Ohio, in which other structures were destroyed, while the tall building in the foreground, faced with sand-lime brick, suffered no damage

Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning March 31:

SOUTHWESTERN FREIGHT BUREAU DOCKET

7709 (1)—**Sand,** from Price, Okla., to points in Kansas. To establish rate of 7 cents per 100 lb. on sand, carloads, minimum weight marked capacity of car, but not less than 60,000 lb., except when car is loaded to full visible carrying capacity, in which case actual weight will govern, from Price, Okla., to Big Hill and Neodesha, Kan., inclusive. Shippers states that they are unable to meet the Kansas City competition and have asked for rates from Price, Okla., on same basis as Kansas City.

7710 (1)—**Sand,** from Shirk, Okla., to points in Missouri. To establish rate of 7 cents per 100 lb. to stations, Provision to Macomb, Mo., inclusive, 9 cents per 100 lb., stations Norwood to Cabool, Mo., inclusive, 10 cents per 100 lb., stations Sargent to Trask, Mo., inclusive, and 10½ cents per 100 lb. to Mountain View, Mo., on sand, carloads, minimum weight marked capacity of car, but not less than 60,000 lb., except when car is loaded to full visible carrying capacity, in which case actual weight will govern, from Shirk, Okla. Shippers have made complaint that present rates will not permit them to market their product at points south of Springfield because a more favorable rate to these points now enjoyed by Kansas City competitors and has asked that rates be established on basis of present Oklahoma mileage scale which places rates on a parity with Kansas City.

7713 (1)—**Sand,** from points in Oklahoma to Ft. Scott, Kan. To establish a rate of 7 cents per 100 lb. on sand, carloads, minimum weight marked capacity of car, but not less than 60,000 lb., except when car is loaded to full visible capacity in which case actual weight will govern, from Shirk and Price, Okla., to Ft. Scott, Kan. Shippers state that they are unable to meet competition from Kansas City and it is desired to establish the same rate as carried to Garland and Mulberry, Kan., and Springfield, Mo.

7714 (1)—**Silica,** from Rogers, Ark., to points in the southwest. To establish a rate of 16½ cents per 160 lb. to Dallas, 17 cents per 100 lb. to Ft. Worth, 25 cents to Houston and San Antonio, Tex.; 16½ cents per 100 lb. to Shreveport and 15 cents per 100 lb. to Oklahoma City on silica, crushed or ground, in bulk, in bags, silica flour, in bulk, in bags, straight or mixed carloads, minimum weight 60,000 lb. from Rogers, Ark. Operators of silica plant recently opened at Rogers, find that present basis of rates is prohibitive in marketing their product.

7716 (2)—**Cement plaster,** from Plasterco, Tex., to points in Oklahoma. To establish same rates on cement plaster and other articles as described in S. W. L. Trf. 3-F from Plasterco, Tex., to points in Oklahoma on the new extension of the A. T. & S. F. Ry. south of Elkhart, Kan., as has been recently authorized from Hamlin, Tex. It is proposed to establish rates based the same arbitrary over Elkhart on shipments originating at Plasterco as has been recently authorized from Hamlin, Tex.

7731. (1) **Limestone,** from Carthage, Mo., to points in Kansas. To establish the following rates in cents per ton of 2000 lb. on agricultural limestone, carloads, to apply only on such agricultural limestone which has passed or will pass through a screen with round holes ⅛-in. or less in diameter. Minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply. In no case shall the minimum weight be less than 40,000 lb., from Carthage, Mo., to points in Kansas on the Missouri Pacific R. R.:

50 miles and less	70
60 miles and over 50 miles	80
70 miles and over 60 miles	90
80 miles and over 70 miles	100
90 miles and over 80 miles	110
100 miles and over 90 miles	120
115 miles and over 100 miles	130
145 miles and over 115 miles	140
160 miles and over 145 miles	150
175 miles and over 160 miles	160
200 miles and over 175 miles	170
225 miles and over 200 miles	180
250 miles and over 225 miles	190

It is contended that there is no good reason why this commodity cannot move freely at rates somewhat higher than the low crushed stone rates which were established primarily for use in paving work in Missouri and Kansas.

7738. (1) **Calcite,** from Southern points to Little Rock, Ark. To establish a rate of $4.53 per ton of 2000 lb., from Cartersville, Ga., and rate of $3.07 per ton of 2000 lb., from Sparta, Tenn., on calcite (ground or pulverized limestone or marble), carloads, minimum weight marked capacity of car, except when car is loaded to full visible capacity, when actual weight will apply, to Little Rock, Ark. The proposed rates, it is stated, are based on combination of locals through Memphis, Tenn.

7783. (1) **Oyster shells,** from Texas producing points to Muscatine, Iowa. To establish a rate of 27 cents per 100 lb. on oyster shells, crushed or uncrushed, in bulk, carloads, minimum weight 80,000 lb., from Texas producing points in common point territory to Muscatine, Iowa. It is stated that a minimum car of 50,000 lb. under the present rate yields $180. Under the proposed rate and minimum the charge would be $216, or $36 higher than the present minimum car rate. The proposed rates of 27 cents minimum 80,000 lb. is to alternate with the present rate of 36 cents minimum weight 50,000 lb.

7833—(1) **Lime,** from Ash Grove, Mo., to points in Nebraska. To establish the following rates in cents per 100 lb. on lime, carloads, from Ash Grove, Mo., and points grouped therewith to points shown below:

To	Min. Wt. 30,000 lb. Rates	Min. Wt. 40,000 lb. Rates
Jackson, Neb.	22½	....
Willis, Neb.	24½	....
Ponca, Neb.	27	....
New Castle, Neb.	29½	....
Maskell, Neb.	30	....
Obert, Neb.	30½	28½
Wynot, Neb.	31	29
Wakefield, Neb.	24	....
Concord, Neb.	24	....
Laurel, Neb.	24	....
Coleridge, Neb.	27½	....
Hartington, Neb.	30	29
Fordyce, Neb.	31	....
Crofton, Neb.	33	....
Wayne, Neb.	26	....
Carroll, Neb.	26	....
Sholes, Neb.	26	....
Randolph, Neb.	26	28½
Magnet, Neb.	29½	....
Wausa, Neb.	31	....
Bloomfield, Neb.	33	....
Winside, Neb.	29½	....
Hoskins, Neb.	29½	28½
Norfolk, Neb.	29½	....

It is stated that in checking rates on lime from the Ash Grove, Mo., Group to stations on the C. St. P. M. & O. Ry. in Nebraska there are several instances where the through rates are higher than the combination rates through Coburn and Emerson, Neb., in connection with B. T. Jones' Combination Tariff 228.

7869—(1) **Cement,** from St. Louis, Mo., to points in Oklahoma. To establish a rate of 20½ cents per 100 lb. to Dewey, Okla., and 24 cents per 100 lb. to Ada, Okla., on hydraulic and portland cement, carloads, minimum weight 50,000 lb., from St. Louis, Mo. Shippers in St. Louis territory have asked that there be established rates based on the 8182 scale which will result in a more equitable rate from St. Louis when compared with the present combination from the two points mentioned.

7800—(1) **Asphalt rock,** from points in Kentucky to points in Arkansas and Louisiana. To establish a rate of $5.08 per ton of 2,000 lb. on asphalt rock, as described in Illinois Central R. R. Tariff 2316-series, from Big Cliftv, Rockport and Summit, Ky., to stations on the K. C. S. Ry., between Texarkana and Shreveport, La. At the present time there are no through rates in effect on this traffic and interested shippers have complained and request that lower rates be established.

7811—(2) **Marble, crushed,** from Whitestone, Ga., to points in Texas. To establish a rate of $6.65 per ton of 2,000 lb. on crushed marble and crushed stone, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full visible capacity, when actual weight will govern, from Whitestone, Ga., to Dallas and Ft. Worth, Tex. It is desired to publish the Vicksburg, Miss.-Shreveport, La., combination on the above traffic.

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4936. TX. **Sand,** carloads, from Romayor, Texas, to Smiths Bluff, Magpetco, Pt. Neches and Atreco, Texas. Proposition from carriers to establish rate of 80 cents per ton of 2000 lb. on sand, carloads, minimum weight marked capacity of car, from Romayor, Texas, to Smiths Bluff, Magpetco, Port Neches and Atreco, Texas.

6553-TX. **Rip rap,** carloads, rates on from Beckman, Texas, to Rockport, Texas. Proposition from carriers to establish rates of 7½ cents per 100 lb. on rip rap stone of greater weight than 200 lb. per piece, minimum weight 50,000 lb., except where marked capacity of car is less, from Beckman, Texas, to Rockport, Texas, for jetty work, benefit to accrue to the City of Rockport or Aransas county. Rate to expire December 31, 1926.

6556-TX. **Cement,** plaster, from Texas producing points to Corpus Christi for export. Proposition from carriers to add Corpus Christi on the Galveston basis on cement plaster as described in Item 1380, S. W. L. Tariff 3F, from Texas producing points to Corpus Christi for export.

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12744 (2)—**Lime**, common, hydrate, quick or slacked, carloads, Becks, Mitchell, Murdock and Salem, Ind., to points in Wisconsin.

12749 (1)—**Present and proposed rates on lime** from Becks, Mitchell, Murdock and Salem, Ind., to points in Wisconsin. Minimum weight as per Official Classification except as noted.

	Mitchell, Ind.		Hannibal, Mo.
C. M. & St. P.—	Present	Proposed	Present
Pewaukee	24	*20.5	*20.5
Hartland	24	*20.5	*20.5
Oconomowoc	24	*20.5	*20.5
Waterloo	24	*20.5	*20.5
Sun Prairie	24	*20.5	*20.5
Genessee	24	18	17
Palmyra	24	18	17
Milton	24	18	17
Stoughton	24	*20.5	*20.5
Mayhew's	24	18	17
Springfield	24	18	17
Darien	24	18	17
Morgan's Farm	24	18	17

*Min. wt., 40,000 lb.; rate, 19c.

12750 (2)—**Concrete sewer pipe,** carloads, loose, in or open top cars, Louisville, Ky., to Clare, Ohio. Present rate, Cincinnati combination via L. & N. R. R.; proposed, 19½ cents.

12754—(1) (a) To cancel Items 1235, 1240, 1245, 1250, 1260, 1265 and 1270 of C. F. A. T. B. Tariff 130 P insofar as concerns traffic between points in C. F. A. territory as described in C. F. A. T. B. Tariff 130P, and to establish in lieu thereof an item to apply on limestone, unburnt, crushed, ground or pulverized and limestone dust, also on **sand,** crushed, ground or pulverized, when loaded in bulk, or in packages, in box cars, carloads, minimum weight 50,000 lb., which will provide for basis of 60% of 6th class between points in C. F. A. territory as described in aforesaid tariff.

(b) To revise all commodity rates and ratings on this traffic between points in C. F. A. territory, as published in agency and individual lines issues, to a basis of 60% of 6th class, minimum weight 50,000 lb., such revision to be made whether the present basis is higher or lower.

12755. (1) (Cancels White D. A. 12713) Sand, viz.: Blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica, carloads, to Pittsburgh, Penn., from Geauga Lake and Phalanx, Ohio. Present, $1.51 and $1.39 per net ton; proposed, $1.64 and $1.51 per net ton.

12759. (2) **Sand** (other than bank, glass, molding, silica, blast, core, engine filter, fire or furnace, foundry, grinding or polishing or loam) and gravel, carloads, Pleasant Lake, Ind., to Chicago, Ill., and Gary, Ind. Present rate, 96 cents per net ton; proposed, 80 cents per net ton.

12762. (2) **Sand** (except blast, core engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and gravel, carloads, Erie, Penn., to Pittsburgh, Penn., and points taking same rates. Present rate, $1.75 per net ton; proposed, $1.60 per net ton.

12763. (1) **Slag** (a product of iron and steel blast and open hearth furnaces), ashes and cinders, carloads, except that on slag (Ohio intrastate traffic) the minimum weight will be 80% of marked capacity of car, Cleveland, Ohio, to Fairlawn, Ohio. Present rate, 70 cents per net ton; proposed, 80 cents per net ton.

12777. (2) **Gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, La Fayette, Ind., to Champaign, Ill. Present rate, 14½ cents; proposed, 80 cents per net ton.

12781. (2) **Sand and gravel**, carloads, Columbus, Ohio (N. Y. C. R. R.-O. C. Lines), to Athens, Shawnee and Zanesville, Ohio. Present rate, $1.10 per net ton to Shawnee and Athens, and $1.00 per net ton to Zanesville, Ohio; proposed, 80 cents per net ton.

12795. (Shippers' request.) To establish commodity rates on **cement**, common, hydraulic, natural or portland, carloads, from Bessemer, Wampum, New Castle and Walford, Penn., also from Painesville, Ohio, and Bay Bridge, Ohio, to common and junction points within the Pittsburgh Group (east of Pittsburgh) and arbitrary territory, including that portion of B. & O. R. R. east of Parkersburg, W. Va., through Silver Run, W. Va., West Union, W. Va., to Grafton, W. Va., inclusive, including such points as are necessary to provide basing points in instances where the distance between common or junction points is in excess of 25 miles. Such commodity rates are checked in on basis of 114% of the C. F. A. cement scale in accordance with the formula prescribed in connection with I. C. C. Docket 12710. The through distances are figured over the shortest routes via junctions at which there are track connections, by use of not exceeding three lines or parts of lines or railroads, except where by use of four lines or parts of lines, it results in reducing by 30 miles the distance via three lines.

Statement of representative present and proposed rates is attached hereto.

Justification for change: Basis for the proposed rates is explained in detail under caption, "Proposition." This revision is result of conference between interested shippers and carriers at public hearing in New York City on the second instant.

Illustration

Present and Proposed Rates on Cement, Carloads, Basis 114% of I. C. C. Docket 12710 Scale

	From Bessemer, Penn.		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	31	8.0	8.5
Blairsville	43	11.0	9.0
*Clarksburg	141	14.0	13.0
Connellsville	43	11.0	9.0
Fairchance	63	11.0	9.5
*Grafton	133	13.0	12.5
*Johnstown	67	11.5	9.5
*Morgantown	86	13.0	11.0
Trafford	6	6.0	7.5
Verona	13	8.0	7.5

	From Wampum, Penn.		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	81	11.5	10.5
Blairsville	94	11.5	11.0
*Clarksburg	177	14.5	13.5
Connellsville	94	12.0	11.0
Fairchance	115	12.0	12.0
*Grafton	180	14.5	13.5
Johnstown	118	12.5	12.0
*Morgantown	136	14.5	12.5
Trafford	57	11.5	9.5
Verona	50	8.0	9.0

	From New Castle, Penn.		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	89	11.5	11.0
Blairsville	102	11.5	12.0
*Clarksburg	186	14.5	14.5
Connellsville	103	12.0	12.0
Fairchance	124	12.0	12.5
*Grafton	189	14.5	14.5
Johnstown	127	12.5	12.5
*Morgantown	145	14.5	13.0
Trafford	66	11.5	9.5
Verona	59	8.0	9.5

	From Walford, Penn.		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	95	11.5	11.0
Blairsville	108	11.5	12.0
*Clarksburg	191	14.5	14.5
Connellsville	108	12.0	12.0
Fairchance	129	12.0	12.5
*Grafton	194	14.5	14.5
Johnstown	132	12.5	12.5
*Morganiown	151	14.5	13.0
Trafford	71	11.5	10.5
Verona	64	8.0	9.5

	From Painesville, Ohio		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	168	13.0	13.5
Blairsville	181	15.0	14.5
*Clarksburg	259	17.7	16.0
Connellsville	181	17.0	14.5
Fairchance	202	15.0	15.0
*Grafton	261	17.7	16.5
Johnstown	205	16.0	15.0
*Morgantown	225	17.7	15.5
Trafford	144	13.0	13.0
Verona	137	13.0	12.5

	From Bay Bridge, Ohio		
To points in Pennsylvania except as noted	Miles	Pres. Rate	Pro. Rate
Belle Vernon	238	13.0	15.5
Blairsville	250	15.0	16.0
*Clarksburg	286	17.7	17.0
Connellsville	250	15.0	16.0
Fairchance	271	15.0	16.5
*Grafton	279	17.7	16.5
Johnstown	274	16.0	16.5
*Morgantown	280	17.7	16.5
Trafford	213	13.0	15.0
Verona	206	13.0	15.0

*Points in state of West Virginia.

12756. (2) **Lime**, carloads, Chicago and points taking same rates, to C. F. A. territory. Present, 6th class; proposed, rates which are in accordance with scale prescribed by the Interstate Commerce Commission in the Lehigh Lime Co. Case, I. C. C. Docket 13014 (Vol. 85, I. C. C. 341). **Illustrations** of proposed rates:

To	Mileage	Proposed Rates
Akron, Ohio	349.9	18
Alliance, Ohio	377.7	18½
Anderson, Ind.	176.0	13½
Battle Creek, Mich.	156.0	13
Benton Harbor, Mich.	90.5	11½
Bucyrus, Ohio	267.2	16½
Cincinnati, Ohio	281.0	17
Cleveland, Ohio	334.5	17½
Columbia City, Ind.	129.0	12½
Columbus, Ohio	294.4	17
Dayton, Ohio	250.8	16
Detroit, Mich.	267.8	16½
Flint, Mich.	249.6	16
Ft. Wayne, Ind.	148.0	13
Grand Rapids, Mich.	176.5	13½
Hamilton, Ohio	255.5	16
Holland, Mich.	151.2	13
Howell, Mich.	237.6	15½
Indianapolis, Ind.	184.0	14
Jeffersonville, Ind.	292.0	17
Kalamazoo, Mich.	136.7	12½
Kokomo, Ind.	140.0	12½
Laporte, Ind.	59.0	10½
Lima, Ohio	207.5	14½
Logansport, Ind.	118.0	12
Manistee, Mich.	287.5	17
Mansfield, Ohio	293.2	17
Midland, Mich.	296.2	17
Muncie, Ind.	180.0	13½
Muskegon, Mich.	184.9	14
Orrville, Ohio	335.8	17½
Owosso, Mich.	231.1	15½
Pittsburgh, Pa.	457.5	20
Plainwell, Mich.	148.4	13
Plymouth, Ind.	84.0	11½
Port Huron, Mich.	315.1	17½
Portsmouth, Ohio	392.0	18½
Richmond, Ind.	220.0	14½
Ridgeville, Ind.	198.0	14
Rochester, Pa.	431.8	20
South Bend, Ind.	86.0	11½
St. Joseph, Mich.	88.6	11½
Terre Haute, Ind.	178.0	13½
Toledo, Ohio	231.5	15½
Vincennes, Ind.	235.0	15½
Watervliet, Mich.	102.7	12
Wheeling, W. Va.	428.8	19
Wolcottville, Ind.	135.0	12½
Youngstown, Ohio	403.1	19

12784—(2) **Sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, molding or silica) and gravel, carloads, Attica, Ind., to Gebhard Block, Forsyth, Emery, Marva and Craig, Ill. Route—Via Wabash Ry., Decatur, Ill., and Illinois Traction System. Present rate, 16 cents; proposed, $1.01 per ton.

12786—(1) **Gravel and sand** (except blast, engine, foundry, glass, grinding or polishing loam, molding or silica), carloads, Sargents, Ohio, to Coalton, Jackson and Wellston, Ohio. Present rate, 90 cents per net ton; proposed, 70 cents per net ton on traffic routed via N. & W. R. R., Glen Jean, Ohio, and D. T. & I. R. R.

12797—(2) **Cement**, in straight carloads, or in mixed carloads with bricklayers' cement, carloads, minimum weight 50,000 lb., except when marked capacity of car used is less the actual weight but not less than 40,000 lb. will apply, Ottawa, Ill., to C. F. A. territory. Present rate: Fifth class, minimum weight 36,000 lb. Proposed: Rates based on the mileage scale but worked out and published as specific rates (in the same manner as from LaSalle and Utica).

12802—(2) **Sand** (except blast, core, **engine**, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, carloads, Attica, Ind., to Pittsfield, Barry and Kinderhook, Ill. Present rates: 126c to Pittsfield and 139c per net ton to other destinations. Proposed: 113c per net ton.

12805—(2) **Gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), carloads, Columbus and Zanesville, Ohio, to Fredericktown, Ohio. Present rate: 100c per net ton. Proposed: 90c per net ton.

12808—(2) **Crushed stone** in bulk in open top cars, carloads, Piqua, O., to Urbana, O. Present rate: 90c per net ton. Proposed: 60c per net ton.

12821—(2) **Rip-rap stone**, in open cars, carloads, Romona, Ind., to Columbia, O. Present rate: 18c. Proposed: 140c per net ton.

12829—(2) **Crushed stone**, in bulk in open top cars, carloads, Piqua, O., to Springfield, O. Present rate: 100c (P. R. R. delivery) and 90c per net ton (D. T. & I. delivery). Proposed: 80c per net ton.

12830—(2) **Crushed stone**, in bulk in open top cars, carloads, Piqua, O., to various points in Ohio.

To—	Proposed Per net ton	Pres. rate 6th class
Celina	85c	13c
Ohio City	95	13½
Paulding	105	15
Castine	80	11½
Lewisburg	85	13
Lippincott	75	11½
Bellefontaine	80	11½
Huntsville	85	13
Richland	85	13
Belle Center	90	13
Harper	85	15
Rushylvania	85	13
Big Springs	90	13
Ridgeway	90	13
Irwin	85	12
Catawba	90	12
Marysville	85	13

12835—(2) **Crushed stone** and crushed stone screenings, carloads, Bluffton, Ind., to Matthews, Ind. Present rate: 12c (6th class). Proposed: 92c per net ton.

12836—(2) **Sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, carloads, Cleveland, O., to Fremont, Norwalk, Toledo and Milan, O. Present rates, 6th class. Proposed rates from Cleveland, O., to—

Fremont, O.	110
Norwalk, O.	90
Toledo, O.	120
Milan, O.	100

12839—(2) **Sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), carloads, to Macon, O., from Chillicothe, Sargents and Portsmouth, O. Present rate: From Chillicothe, O., 120c; Sargents and Portsmouth, O., 100c per ton of 2,000 lb. Proposed: From Chillicothe, 105c; Sargents and Portsmouth, O., 95c per ton of 2,000 lb.

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25858. (Shippers; rate suggested by carriers.) **Stone, crushed**, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their full visible capacity, actual weight will govern, from Mascot, Tenn., to Welcome, N. C. Combination now applies. Proposed, $1.80 per net ton.

25866. (Shippers.) **Rock asphalt**, as described in I. C. R. R. Tariff 2316 series, from Big Clifty, Rockport and Summit, Ky., to Sellers, Ala. Present rate, 31 cents per 100 lb.; proposed, $4.80 per net ton, same as the current rate from Bowling Green, Ky.

25870. (Shippers; rates suggested by carriers.) **Cement, carloads**, as described in Agt. Glenn's Cement Tariff, I. C. C. A455, from Birmingham, Boyles, North Birmingham, Leeds and Ragland, Ala., to High Point, Thomasville and Denton R. R. stations. It is proposed to establish reduced rate of 30 cents per 100 lb., based 4 cents per 100 lb. higher than rate to High Point, Thomasville and High Rock, N. C.

25875. (Carrier.) **Fullers earth**. It is proposed to cancel the present commodity rates on fullers earth and kaolin clay, carloads, from Ellenton, Fla., to all destinations shown in S. A. L. Ry. I. C. C. A6887, account of no movement. Class or combination rates to apply after cancellation.

25881. (Carrier.) **Shells, oyster**, crushed or ground, also not crushed or ground, carloads, usual description, from Gulf ports and shipping points on the N. O. & M. Division of the L. & N. R. R., Pensacola, Fla., to New Orleans, La., inclusive, to Findlay and Ottawa, Ohio. Combination rates of 48½ cents per 100 lb. now applies; proposed, 38½ cents per 100 lb., same as rate in effect from Gulf ports to Detroit, Mich.

25886. (Carriers.) **Earth, infusorial** (fossil flour, fossil meal and Kieselguhr), carloads, minimum weight 30,000 lb., from Clermont, Fla., to Decatur, Ill. Combination applies at present. Proposed, $17 per ton of 2000 lb., same as rate recently approved to Chicago, Ill.

25893. (Shipper; rates suggested by carrier.) **Sand**, carloads, from Lipe and Sawyers Mill, Tenn., to points named below. In lieu of combination rates it is proposed to establish the following commodity rates:

	In cents per net ton
From Sawyers Mill, Tenn., to	
Knoxville, Tenn.	214
Jacksonville, Fla.	266
Newman, Ga.	203
Asheville, N. C.	216
From Lipe, Tenn., to	
Charlotte, N. C.	252
From Sawyers Mill, Tenn., to	
Gastonia, N. C.	240
Raleigh, N. C.	275

The rate proposed to Knoxville is the same as in effect from Lipe, Tenn. Rates to other points are made on basis of the carriers proposed Georgia scale, extended to cover the distance where in excess of 460 miles.

25894. (Carrier.) **Crushed marble** and crushed **stone,** carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern, from Whitestone, Ga., to Dallas and Fort Worth, Texas. Present rate: Vicksburg, Miss.-Shreveport, La., combination, viz.: $6.65 per net ton; proposed through rate, $6.65 per net ton (combination).

25957. (Carriers.) **Crushed stone,** carloads, from Whitestone, Ga., to Milwaukee, Wis. Rate published to become effective April 10, 1926, $5.03; proposed, $5.13 per net ton, based on Chicago, Ill., combination. The proposed rate to be subject to minimum weight of 60,000 lb. to Chicago; beyond, minimum weight 90% of marked capacity of car, except that when weight of the shipment loaded to full visible capacity of car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb.

24449. (Shippers.) **Lime.** It is proposed to establish rate of $4.10 per net ton on lime, carloads, minimum weight 30,000 lb., from kilns in Virginia on the C. & O. Ry., N. & W. Ry., So. Ry., and Vgn. Ry. to Jacksonville, Fla., for beyond, based 40 cents per ton less than the rate proposed in Submittal 11180, from Virginia kilns to Jacksonville, Fla., proper.

25961 (shipper)—**Gravel,** carloads, minimum weight 90% of marked capacity of car used, except when cars are loaded to their visible capacity, actual weight will govern, from Coosada, Prattville Junction and Jackson's Lake, Ala., to McKenzie, Ala. Present rate, 120; proposed intrastate rate, 104 cents per net ton, same as rate from Montgomery recently approved for publication.

25964 (shipper; rates suggested by carrier)—**Gravel.** It is proposed to revise the rates on gravel, carloads, (subject to present description and carloads minimum weight) from Nashville, Tenn., to L. & N. R. R., Memphis Line stations to be not higher than the rates on crushed or broken stone, carload, from Franklin, Tenn., to the same points.

25983 (shippers; rates suggested by carriers)—**Cement,** carloads, usual description and minimum weight, from Norfolk, Va., to West, Frances and Kenansville, N. C. (Atlantic & Carolina Ry. stations). Present rate, 56½ cents; proposed, 26 cents per 100 lb., based on Warsaw, N. C., combination.

25985 (carrier)—**Sand.** It is proposed to cancel the present commodity rate of 225 cents per net ton, minimum weight 40,000 lb., on sand, carloads, from Cooks Springs, Ala., to New Orleans, La., as published in So. Ry. I. C. C. A9890, and permit rate of 198 cents per net ton, applicable on sand, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern (as published in So. Ry. I. C. C. A9895) to apply.

26002 (carrier)—**Gravel.** It is proposed to cancel the present commodity rate of 2½c per 100 lb., on gravel, carloads, from Brunswick, Tenn., to Memphis, Tenn., as published in L. & N. R. R. I. C. C. A15195, account of no movement. Class "N" rate to apply after cancellation.

26013 (shipper)—**Gravel,** carloads, minimum weight stencilled capacity of car, except where cars are loaded to visible capacity and (or) in the absence of weighing facilities at shipping point, if freight is weighed in transit or at destination, carloads, minimum weight will be 90% of the stenciled capacity of car, from Nashville, Tenn., to Dyersburg, Tenn. Present rate: 160c per net ton. (Camden, Tenn., combination.) Proposed: 124c per net ton (intrastate only), same as rate in effect on crushed stone from Mimms, Tenn., to Dyersburg.

26015 (shippers)—**Crushed stone,** carloads, (subject to description applicable to Chattanooga, Tenn.), from Mimms and Newsom, Tenn., to Cleveland, Tenn. Present rates: Chattanooga, Tenn., combination. Proposed: From Mimms, 158; Newsom, 162c per net ton, based on the carriers' proposed Georgia Joint Line scale less 10 per cent.

26024 (shipper; rate suggested by carrier)—**Stone, crushed,** carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Whitehead, Tenn., to Albany and Decatur, Ala. Present rate: 120. Proposed: 90c per net ton, same as rate in effect from Birmingham, Ala.

26033 (carrier)—**Phosphate rock.** It is proposed to cancel the present commodity rate of 484 cents per ton of 2,240 lb., on phosphate rock, carloads, from points in the state of Florida on the A. C. L. R. R. and C. H. & N. R. R. as shown in Note 1, page 2, of A. C. L. R. R. I. C. C. B2334, to Newport News, Va., account of no movement. Combination rates to apply after cancellation.

26054 (shippers; rates suggested by carriers)—**Granite or stone.** It is proposed to establish rates on granite or stone, crushed or rubble, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to visible capacity, actual weight will govern, from Columbia, S. C., to stations on the Ga. Fla. Ry. stations between Augusta and Wrens, Ga., including Wrens, Ga., on basis of the usual joint line scale. Rates on this basis resulted in considerable reductions when compared with the present rates.

Western Trunk Line Docket

1665-B—**Rock, crushed,** carloads, from Pixleys, Mo., to points in Iowa, Kansas, Missouri and Nebraska as named in W. T. L. Tariff 164A, Agent E. B. Boyd's I. C. C. A1389. Present rates as named in W. T. L. Tariff 164A, I. C. C. A1389. Proposed—Establish same rates from Pixleys, Mo., as at present in effect from Kansas City, Mo.-Kan., to the same points. Minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply, but in no case shall the minimum carload weight be less than 40,000 lb.

7693 (1)—**Silica,** from Rogers, Ark., to interstate points. To establish a rate of 36 cents per 100 lb. to Detroit, Mich., and Cleveland, O., 27½ cents per 100 lb. to Cincinnati, O., and 41½ cents per 100 lb. to Pittsburgh on silica, crushed or ground in bulk, in bags, silica flour, in bulk, in bags; straight or mixed carloads, minimum weight 60,000 lb., from Rogers, Ark. Operators of silica plant recently opened at Rogers, Ark., desire to market their product at various eastern points in competition with other Arkansas producers at Malvern, Benton and other points in that district.

4742-A. **Sand,** carloads, from Ottawa, Ill., to Fairfield, Iowa. Present, $2.20 per ton; proposed, $1.80 per ton. Minimum weight marked capacity of car except that when actual weight of shipment loaded to full visible capacity of car is less, such actual weight but not less than 40,000 lb., will apply.

5239. **Lime, carloads,** from Manistique, Limestone Spur, Mich. (2 2/10 miles north of Blaney Junction, Mich.), Marblehead Spur, Mich., and Blaney Junction, Mich., to Freeport, Ill. Present, no through rates published today; proposed, 17½ cents. Minimum weight 40,000 lb.

5244. **Stone, broken, crushed or ground,** from and to Western Trunk Line territory. Present, various basis; proposed, amend commodity description of individual and committee issues in W. T. L. territory on sand, gravel and stone to include stone, broken, crushed and ground. Minimum weight, marked capacity of car. (By shipper.)

4357-A. **Cement, lime and/or plaster,** mixed car shipments, from Mason City, Iowa, to stations in South Dakota. Present, no mixture rules; proposed, to apply on cement, carload rate at actual weight but not less than 50,000 lb. In lime and/or plaster, actual weight, with rate of 3 cents higher than the rate charged on cement.

4559A. **Sand, gravel or stone** (ground, chipped, dust, rip rap and rubble), carloads, between Kansas City and St. Joseph, Mo., on the one hand, and stations in Nebraska on Un. Pac. and St. J. & G. I. Ry. on the other, of which the rates and distances as shown below are representative. Rates—Present, Class E.

Distance	Proposed cents
5 miles	3½
50 miles	3½
100 miles	6
150 miles	7½
200 miles	8½
300 miles	10½
400 miles	12
500 miles	14

Minimum weight 90% of marked capacity of car, except that when weight of shipments loaded to full visible capacity of car is less than 90% of marked capacity of car, the actual weight will apply, but not less than 40,000 lb.

5256. **Rock, gypsum,** carloads, from Blue Rapids, Kan., to Sugar Creek, Mo. Rates: Present, 10 cents per 100 lb.; proposed, 8½ cents per 100 lb. Minimum weight 80,000 lb. (By shipper.)

5182. **Retarder,** cement plaster, carloads, from Fort Dodge and Webster City, Iowa, to Blue Rapids, Kans.

From	Min. wt.	Pres.	Prop.
Ft. Dodge	36.000	29½	29½
Ft. Dodge	60,000	....	19
Webster City	36,000	30½	30½
Webster City	60,000	23	19

5260. **Cement, hydraulic or natural,** in straight carloads or in mixed carloads with bricklayers' cement, from Ottawa, Ill., to points in W. T. L. territory. Rates: Present, Class "C"; proposed, cement rates based on the mileage scale but worked out and published as specific rates (in the same manner as from La Salle, Utica, etc.), Minimum weight 50,000 lb., except that when **marked capacity of car used is less the actual weight but not less than 40,000 lb. will apply. (By shipper.)**

496F—**Stone, crushed,** carloads, from Louisville, Neb., to points in So. Dakota as shown below. Present: Combination rates. Proposed: To Fairfax and Bonesteel, S. D., $2.10 per net ton. To St. Charles, Herrick, Burke and Gregory, $2.20 per net ton. To Dallas, Colome and Winner, S. D., $2.30 per net ton. (By shipper.)

1062-I—**Sand and gravel,** carloads, from Eddyville, Ia., to following Missouri points.

To Mercer: Present, 8c; proposed, 7c. Alvord, Princeton: Present, 9; proposed, 7. Mill Grove: Present, 10; proposed, 7. Spickards, 11; proposed, 7. Tindall: Present, 11½; proposed, 7. Trenton: Present, 12; proposed, 7. Hickory Creek, Jamesport, Blake, Wabash Crossing, Gallatin, Highland: Present, Class E; proposed, 7. Altamont, Winston, Mabel: Present, Class E; proposed, 8. Cameron: Present, Class E; proposed, 8½.

Minimum weight 90% of marked capacity of car except that when car is loaded to full visible capacity actual weight will apply, but not less than 50,000 lb. (By shipper.)

Trunk Line Association Docket

Sup. 1 to Rate Proposal 12980. (Carrier.) **Cement,** compound, carloads, dry, powdered, in bags, minimum weight 50,000 lb., from Martinsburg, W. Va., and Security, Md., to L. I. R. R. points; Group A 17½ cents, Group B 20 cents, Group C 21 cents and Group D 24 cents per 100 lb. Reason: To publish the same rates from Martinsburg and Security as are proposed from Berkeley, W. Va., to L. I. R. R. File 37171.

13182 (carrier)—**Cement,** common, hydraulic, natural or portland, carloads, from Howes Cave and Glen Falls, N. Y., to B. & M. R. R. stations, Brattleboro, Vt., to White River, Jct., inclusive, $3.40 per net ton. Reason: Rate same as applies from Hudson, Alsen, N. Y. File 38440.

13193 (increase) (carrier)—(a) **Sand** (other than blast), engine, glass, moulding, foundry, ground from silica or pebble rock, silica and loam, carloads, and **gravel, carloads.**

(b) **Sand,** blast, engine, foundry, glass, moulding or silica, sand, ground from silica or pebble rock, carloads, sand, loam, carloads, from B. & O. R. R. stations, Allegheny (Pittsburgh North Side), Bessemer, Junction Transfer, McKeesport, Millvale, Pittsburgh and Rankin, Penn., to Morgantown, Sabraton, W. Va., a $1.50, b $1.64 per 2,000 lb.

Reason: Proposed rate is based on West Virginia Mileage Scale. The proposed rate to Sabraton, W. Va., being the same as to Morgantown account being in the switching limits of same.

M-618 (shippers)—To establish rates on cement, common, hydraulic, natural or portland (not waterproofed), in cloth or paper bags, barrels, or in bulk, carloads, minimum weight 50,000 lb., except when for carrier's convenience, cars of less capacity are furnished, in which case minimum weight will be the marked capacity of car furnished, but in no case less than 40,000 lb., from Akron Falls, N. Y., to Trunk Line territory. Statement of rates will be furnished upon request. File 38013.

New England Freight Association Docket

9865. (2-R.) **Molding sand,** minimum weight, 90% of marked capacity of car, from B. & M. R. R. and B. & A. R. R. New York sand shipping stations to **Thamesville,** Conn., 16 cents. Reason: To place the rate to Thamesville on a parity with that now published to Norwich, Conn., an adjacent point.

9891 (1R)—**Lime,** minimum weight 40,000 lb., from Rockland, Thomaston and Warren, Maine, to stations on the N. Y. N. H. & H. R. R. on the same basis as in effect from Rutland R. R. and Central Vermont Ry. territory.. Reason—To revise rates from Rutland district so as to meet competition.

9892 (2R)—**Lime,** from Dover Plains, N. Y., to Mechanicsville, N. Y., 13, via N. Y. C. R. R., Chatham, N. Y., B. & A. R. R., N. Y. C. R. R., Troy, N. Y., and D. & H. Co. Reason—To permit movement of traffic.

9913 (2R)—**Lime and limestone,** minimum weight 40,000 lb., from Cheshire, Farnams, North Adams, Renfrew, Richmond and Zylonite, Mass., to Atlantic City, N. J., lime 25; limestone, 24; via B. & A. R. R.-W. S. R. R.-Penn. R. R. Reason—To place the rate via the Penn. R. R. on the same basis as via the Reading Co.

Illinois Freight Association Docket

I. R. C. 3581—**Sand and gravel,** carloads, minimum weight marked capacity of car, from Forreston, Ill., to Sterling, Ill. Rates per net ton. Present: 100. Proposed: 90.

Western Trunk Line Dispositions

3146-B—**Talc** (crude), ground or dust, carloads, from Mississippi River crossings on shipments originating east of Illinois-Indiana state line to Des Moines, Ia. Approved rate of 9 cents per 100 lb.

New Cement Plant for Western Pennsylvania

THE West Penn Cement Co., with main office at 233 South Main street, Butler, Penn., has been incorporated under the laws of Pennsylvania and will immediately start the construction of a 6000-bbl. wet-process plant consisting of three units.

The plant will be built on the property formerly owned by the Winfield Stone Co. at West Winfield, Penn., approximately 12 miles southeast of Butler, on the Winfield railroad. The quarry which will serve the new plant is an underground operation and is said to be the first limestone mine operated in America, having operated for more than 50 years.

O. J. Binford, former secretary and general manager of the Southwestern Portland Cement Co., is the new company's general manager.

Knickerbocker Portland Increasing Plant Efficiency

CONSTRUCTION of an additional packing unit and a new truck-loading platform at the mill of the Knickerbocker Portland Cement Co., Inc., Hudson, N. Y., has been announced in a recent issue of the Hudson, N. Y., *Star*. The new installation which will soon be completed, will facilitate the handling of motor truck shipments from the Knickerbocker plant. A concrete driveway connects this new loading platform with the main highway. Special dust-collecting apparatus is to be installed in the new pack house.

United States Gypsum Awards Ship Contract to English Firm

ACCORDING to a special cable from Hal O'Flaherty to the Chicago *Daily News* Foreign Service, dated March 18, 1926, and published in the Chicago, Ill., *Daily News,* a contract for the construction of two 6000-ton steamers of special design was made by Sewell Avery of Chicago, president of the United States Gypsum Co., with the Furness Shipbuilding Co., Ltd., of Haverton Hill on the Tee.

"While our contract is not large," said Mr. Avery, "it was sought by shipbuilders in six nations and was finally awarded to the British because this country remains pre-eminent in the business of turning out ships for commercial purposes. In the face of the obvious depression in the shipbuilding industry, I found the British yards in a state of high efficiency and ready to proceed with filling orders on almost any scale.

"I found it interesting and instructive to deal with British business men. In the negotiations over letting this contract I have been struck repeatedly by the high principles and quiet force of the men in control of Great Britain's enterprises.

"Recent articles in some American newspapers conveyed the impression that Great Britain was 'done.' My experience and observation in the last few weeks are too limited to warrant convictions of great value, but they certainly lead me to believe that this country is far from being 'done.' Great Britain is in a position of strength and should resume its old lead in many lines so adversely affected by the war."

Changes in American Lime and Stone Company Personnel

MANY of our readers will be surprised to learn of the recent resignation of H. W. Sheffer as general superintendent of the American Lime and Stone Co. to accept a position elsewhere. W. R. Cliffe was appointed general superintendent to fill the vacancy caused by Mr. Sheffer's resignation. Mr. Cliffe will supervise the operations of both the Southern Division and Bellefonte plants. He has been with the American company for over a year as superintendent of the Southern Division, including Union Furnace, Goodman, Frankstown, etc. Recently he has been in charge of the new kiln construction at Bellefonte, which is now nearing completion.

A. C. Hewitt, who for some time has been in charge of the engineering work for the American company has been made superintendent of Plant 19 from No. 19 crusher to and including the hydrate plant. At the same time he will continue to direct and supervise the engineering department.

H. E. Willard, who has been employed as assistant superintendent of the Southern Division, has now been put in charge of this division, reporting direct to Mr. Cliffe.

Sidney S. Swindells has joined the company as a member of the engineering department. Mr. Swindells is a graduate of Cornell University and during the past year and a half has been with the Foundation company in New York and Philadelphia.

Portland Cement Association Appoints R. M. Simrall District Engineer for Kansas City

THE Portland Cement Association, Chicago, Ill., announces the appointment of R. M. Simrall as district engineer of its Kansas City office, located in the Gloyd building. The Kansas City office has charge of association work in western Missouri and Kansas.

Mr. Simrall was formerly one of the association's field engineers in Kansas, and prior to joining the organization was engaged in various engineering work in Oklahoma and Missouri.

Texas Plaster Mills Being Enlarged

WORK of enlarging the plaster mills of Certainteed Products Co. at Acme, Texas, and the Beaver Products Co. at Agatite, Texas, the mill town four miles west of Quanah, is steadily progressing.

Ground is being cleared for the erection of the large glass and steel addition to the plant at Acme. This addition will be 750 ft. long and about 90 ft. wide, and is to be used for the manufacture of sheet rock and plaster board from the gypsum deposits underlying this company's holdings here. It is expected work on the main building will start in April.

At the Agatite mill of the Beaver Products Co., several new kettles are being installed. A 250-hp. motor has been ordered. Additions are being made to the mill proper. Two-and-a-half miles of additional track are being laid to the gypsite beds which are being opened up. This company has several thousand acres under lease, covered with the grade of gypsite suitable for making cement plaster, and the supply is practically unlimited, it is said.

A few months ago a trainload of Acme cement plaster was shipped from Quanah to Florida points.

Sand and Gravel Producers Raising Fund for T. R. Barrows Memorial

AT a recent meeting of sand and gravel producers, a committee was formed to find a way of expressing the appreciation and regard felt by members of the National Sand and Gravel Association for the work of the late executive secretary, T. R. Barrows. The committee consists of John Prince, chairman; J. L. Shiely, T. E. McGrath, Alex. W. Dann, and Charles L. Ruffin.

It was decided that the best way to express this was to raise a substantial sum to be known as the T. R. Barrows Memorial Fund, to be expended in such way as will best serve the purpose and receive the approval of Mrs. Barrows. It was also suggested that the sand and gravel producers subscribe to this fund in amounts varying from $10 to $50 in proportion to their ability. In the case of members of the National Association this subscription might well bear the proper relation to the grading of dues in that association.

The above amounts were, however, merely suggested and subscription in such amount as seems proper should be made. While this is in no way an action of the National Association, as a matter of convenience the treasurer of the association, J. L. Shiely, has been asked to act as treasurer of this fund.

The committee will be glad to receive suggestions from any subscriber in regard to the proper use of the fund and will report from time to time on the progress made.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.15	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	1.25	
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Eastern Pennsylvania	1.35	1.35	1.35	1.35	1.35	1.35
Frederick, Md.	.50	.75	1.30	1.20	1.10	1.10
Munns, N. Y.	1.00	1.25	1.40	1.30	1.25	
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	
Walford, Penn.	.70	1.35	1.35	1.35	1.35	1.50
Watertown, N. Y.	.50		1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.			.50			1.50
Alton, Ill.	1.85		1.85			
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.10		1.20	1.00	1.25	1.25
Chasco, Ill.	1.25					1.15
Columbia, Krause, Valmeyer, Ill.	1.00@1.50	1.20@1.25	1.20@1.25	1.20	1.20	1.50
	Flux 1.50@1.75					
Cypress, Ill.	1.15	1.15	1.15	1.15	1.05	1.00
Gary, Ill.	1.00	1.37½	1.37½	1.37½	1.37½	1.37½
Greencastle, Ind.	1.30	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Milltown, Ind.		.90@1.00	.75@ .85	.90@1.00	.85@ .90	.85
Northern New Jersey	1.30		1.80	1.60	1.40	
River Rouge, Mich.	1.10	1.10	1.10	1.10	1.10	1.10
St. Vincent de Paul, Que.	.75	1.25	1.05	.95	.90	.90
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Stone City, Iowa	.75		1.15†	1.05	1.00	
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
SOUTHERN:						
Allgood, Ala.	Crusher run, fines out, for flux, 1.00 per net ton					
Cartersville, Ga.		1.65	1.65	1.25	1.15	
Chico, Texas	1.00	1.40	1.35	1.25	1.20	1.15
El Paso, Tex.	1.00	1.00	1.00	1.00		
Ft. Springs, W. Va.	.50	1.60	1.50	1.35	1.25	
Graystone, Ala.	Crusher run fluxing stone, 1.00 per net ton					
Henderson, N. C.			1.50		1.25	
New Braunfels, Tex.	.30@1.00	1.00@1.30	1.00@1.30	.70@1.00	.70@ .90	
Olive Hill, Ky.	.50@1.00‡	1.00	1.00	1.00	1.00	1.00
Rocky Point, Va.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atkinson, Kans.	.25	2.00	2.00	2.00	2.00	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25		1.25	1.25	1.10	
Kansas City, Mo.	.75	1.65	1.65	1.65	1.65	1.65
Limestone, Wash.	3.00	3.00	3.00	3.00	3.00	3.00
Rock Hill, St. Louis county, Mo.	1.20	1.35	1.35	1.35	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	1.00	1.00	.90	.90	
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.55	1.40	1.25	1.25
New Haven, New Britain, Meriden & Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.60	2.10	1.80	1.50	1.50	
Oakland and El Cerritto, Cal.	1.00	1.00	1.00	.90	.90	
San Diego, Calif.		2.75	2.55	2.35	2.35	
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	
Springfield, N. J.	1.60	2.00	2.00	1.60	1.60	
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	
Coldwater, N. Y.—Dolomite	1.50 all sizes					
Columbia, S. C.—Granite			1.75		1.50	
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Havelock, Ontario		2.60	2.10	2.10		
Lithonia, Ga.—Granite	.75a	2.00	1.75	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	
Middlebrook, Mo.—Granite	3.00@3.50		2.00@2.25	2.00@2.25		1.25@2.00
Northern New Jersey (Basalt)	1.50	2.00	1.80	1.40	1.40	
Richmond, Calif.—Quartzite	.75		1.00	1.00	1.00	
Somerset, Pa. (sand-rock)	1.85@2.00a		1.35@1.50		1.00@1.50	
Toccoa, Ga.—Granite			1.60	1.45	1.40	

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ¼ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh	6.00
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis $CaCO_3$ 90.04%; $MgCO_3$ 1.5%, 100% thru 14 mesh, bags	4.50
Bulk	3.50
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; pulverized; 50% thru 50 mesh	1.50
Cartersville, Ga.—Analysis 68% $CaCO_3$, 32% $MgCO_3$; pulverized	2.50
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Tex.—⅛ in. down	1.50
200 mesh	10.00
Colton, Calif.—Analysis 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Danbury, Conn., Rockdale and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$, 5% $MgCO_3$; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Henderson, N. C. (paving dust)—80% thru 200 mesh, bags	4.25@ 4.75
Bulk	3.00@ 3.50
Analysis $CaCO_3$, 56%; $MgCO_3$, 42%; 65% thru 200 mesh, bags	3.95
Bulk	2.70
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Knoxville, Tenn.—Analysis, 52% $CaCO_3$, 37% $MgCO_3$; 80% thru 100 mesh; bags, 3.95; bulk	2.70
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@ 4.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—50% thru 50 mesh, 2.00; 90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis 99.5% $CaCO_3$, 0.25% $MgCO_3$; 50% thru 200 mesh; bags, 3.25@3.50; bulk	2.00
Toledo, Ohio, 30% through 50 mesh	2.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.10
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—50% thru 4 mesh	.50
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh	1.50
Bettendorf, Iowa—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Blackwater, Mo.—Analysis, 99% $CaCO_3$; 90% thru 4 mesh	.75
Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.75
50% thru 4 mesh	1.50
Chasco, Ill.—50% thru 100 mesh	1.20
Chico, Texas—50% thru 50 mesh; bulk	1.50

(Continued on next page)

Agricultural Limestone

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh		.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh		1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh		**1.35**
Dundas, Ont.—Analysis, 53.8% $CaCO_3$; $MgCO_3$, 43.3%. 50% thru 50 mesh; bags, $4.75; bulk		3.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh		1.50
Garnet, Okla.—All sizes		**1.25**
Gary, Ill.—Analysis, approx. 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh		.90
Kansas City, Mo.—50% thru 50 mesh		.75
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh		2.00
Screenings (¼ in. to dust)		1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk		1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@	2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh		1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh		1.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh		1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh		1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@	1.40
Stone City, Iowa.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh		.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes		**1.25**

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk		3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@	3.50
Rocky Point, Va.—80% thru 200 mesh; bags, 4.25@4.75; bulk	3.00@	3.50
Waukesha, Wis.—90% thru 100 mesh, bulk		**4.50**

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.—Glass sand		**2.25**
Cedarville and S. Vineland, N. J.—Damp		1.75
Dry		2.25
Cheshire, Mass.: 6.00 to 7.00 per ton; bbl		2.50
Columbus, Ohio	**1.25@**	**1.50**
Estill Springs and Sewanee, Tenn		1.50
Franklin, Penn.		**2.25**
Gray Summit and Klondike, Mo		2.00
Los Angeles, Calif.—Washed		5.00
Mapleton Depot, Penn	2.00@	2.25
Massillon, Ohio		3.00
Mineral Ridge and Ohlton, Ohio		2.50
Oceanside, Calif.		3.00
Ottawa, Ill. (Contracts)		1.00
Pittsburgh, Penn.—Dry		4.00
Damp		3.00
Red Wing, Minn.: Bank run		1.50
Ridgway, Penn.	2.00@	2.50
Rockwood, Mich.	2.75@	3.25
Round Top, Md.		2.25
San Francisco, Calif.	4.00@	5.00
St. Louis, Mo.		2.00
Sewanee, Tenn.		1.50
Thayers, Penn.		2.50
Utica, Ill.		1.00
Zanesville, Ohio		2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.75
Columbus, Ohio		**.30@ .90**
Eau Claire, Wis.	4.25	
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

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Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		**1.00***		**1.50***	**1.75***	
Farmingdale, N. J.		.48	.75		1.10	
Hartford, Conn.	.65*					
Leeds Junction, Me.		**.50**	**1.75**		**1.35**	**1.25**
Machias Jct., N. Y.		**.75**	**.75**		**.75**	
Montoursville, Penn.	1.35	1.10	1.00	.75	.75	.75
Northern N. J.		.45@ .70	.45@ .70	1.45	1.45	.145
Olean, N. Y.		.75	.75	.75	.75	.75
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Pa.		**1.85@2.00**		**1.35@1.50**		
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	**.85**	**.85**	**1.70**	**1.50**	**1.30**	**1.30**
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Attica, Ind.			All sizes .75@.85			
Barton, Wis. (f)		.50		.75	.75	.75
Boston, Mass.‡	1.50	1.50	2.50		2.50	2.50
Chicago, Ill.	**.70**	**.50**	**.50**	**.60**	**.60**	**.60**
Columbus, Ohio		.65@ .70	.65@ .70	.65@ .70	.65@ .70	.65@ .70
Des Moines, Iowa	.40	.40	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.50	.50	.95	.95	.95	.95
Elgin, Ill.		**.20***	**.50***	**1.50***	**1.50***	**1.50***
Elkhart Lake, Wis.	.50	.50	.60	.60	.60	.50
Ferrysburg, Mich.		**.50@ .80**	**.60@1.00**	**.60@1.00**		**.50@1.25**
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Haven, Mich.		**.40@ .80**		**.60@1.00**		
Grand Rapids, Mich.		.50		.80		.90
Hamilton, Ohio		**1.00**			**1.00**	
Hersey, Mich.		**.50**		**.70**	**.70**	**.60**
Humboldt, Iowa		.85	2.00	2.00	2.00	
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Mason City, Iowa	**.45@ .55**	**.45@ .55**	**1.35@1.45**	**1.45@1.55**	**1.40@1.50**	**1.35@1.45**
Mankato, Minn.	.55	.45		1.25	1.25	
Mattoon, Ill.	**.75**	**.75**	**.75**	**.75**	**.75**	**.75**
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.70	.70			1.60	
Oregon City, Ore.		**1.25**	**1.25**	**1.25**	**1.25**	**1.25**
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	**1.18**	**1.45**	**1.65**	**1.45**	**1.65**	**1.45c**
Terre Haute, Ind.	.75	.75	.75	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		**.45**	**.60**	**.60**	**.65**	**.65**
Winona, Minn.	.40	.40	1.25	1.25	1.10	1.10
Yorkville, Sheridan, Oregon, Moronts, Ill.		.40@ .70	.30@ .50	.50@ .60	.60	.60
Zanesville, Ohio		.70	.50		.80	
SOUTHERN:						
Charleston, W. Va.		All sand, 1.40.		All gravel, 1.50.		
Chattanooga, Tenn.		**1.45**			**1.20**	**1.20**
Knoxville, Tenn.	**1.00**	**1.00**	**1.20**	**1.20**	**1.20**	**1.00**
Lindsay, Texas					**.55**	
Macon, Ga.	**.50**	**.50**		**1.00**	**1.00**	**1.00**
New Martinsville, W. Va.	1.00	.90@1.00		1.20@1.30		.80@ .90
Roseland, La.	.35	.25	2.25	.75	.75	2.00
WESTERN:						
Kansas City, Mo.	**.80**	**.70**				
Los Angeles, Calif. (points all around) (d)	**.60**	**.50**	**.85**	**.85**	**.85**	**.85**
Los Angeles district (bunkers)†	1.50	1.40	1.85	1.85	1.85	1.85
Phoenix, Ariz.	1.25*	1.00*	2.50*	2.00*@2.25*	1.75*	1.50*
Pueblo, Colo.	.80	.65		1.35		1.20
San Diego, Calif.	.65@ .75	.65@ .75	1.50	1.30	1.10	1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			**Dust to 3 in., .40**			
Boonville, N. Y.	**.60@ .80**		**.55@ .75**			**1.00**
Chicago, Ill.	**.95**					
Des Moines, Iowa	**.50**					
Dudley, Ky.	1.10	1.00	.90			
East Hartford, Conn.			Sand, 65*			
Elkhart Lake, Wis.	**.50**					
Ferrysburg, Mich.						**.65@1.00**
Gainesville, Texas		**.95**				**.55**
Grand Rapids, Mich.	**.50**	**.50**		**.60**		
Hamilton, Ohio					**.70**	
Hersey, Mich.				**.50**		
Indianapolis, Ind.		**Mixed gravel for concrete work, at .65**				
Lindsay, Texas	**1.30**					**.55**
Macon, Ga.	**.40**					
Mankato, Minn.			**Pit run sand, .50**			
Moline, Ill. (b)	**.60**	**.60**	**Concrete gravel, 50% G., 50% S., 1.00**			
Ottawa, Oregon, Moronto and Yorkville, Ill.			**Ave. .60 per ton all sizes**			
Roseland, La.	**.60**					
St. Louis, Mo.			**Mine run gravel, 1.55 per ton**			
Shining Point, Penn.			**Concrete sand, 1.10 ton**			
Smithville, Texas	**.50**	**.50**	**.50**	**.50**	**.50**	**.54**
Summit Grove, Ind.	**.50**	**.50**	**.50**	**.50**	**.50**	**.54**
Waukesha, Wis.	**.60**	**.60**	**.60**	**.60**	**.60**	**.64**
Winona, Minn.	.40	.40	.50	.60	.60	.60
York, Penn.	**1.10**	**1.00**				

(a) ¾ in. down. (b) River run. (c) 2½ in. and less.
*Cubic yd. †Include freight and bunkerage charges and truck haul. ‡Delivered on job.
(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run. (f) plus 15c winter loading charge.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.75	2.75	2.75	1.00@2.75		1.50@4.00	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75@2.00	1.75@2.00		1.75	2.00@2.50	2.00	1.75@2.00
Columbus, Ohio	2.00@2.50	1.50@2.50	2.00@3.00	.20@ .30	2.50	3.50@4.50	1.50@2.00
Eau Claire, Wis.						3.00	3.00
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Elnora, N. Y.			1.75				
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	1.75	1.75	2.00	2.00	2.00		
Gray Summit and Klondike, Mo.	1.75	1.75	2.00	2.00	1.00		.85@1.00
Joliet, Ill.	No. 2 molding sand; loam for luting and open hearth work—.65@.85						
Kasota, Minn.							1.00@1.25
Mapleton Depot, Penn.	2.00	2.00				2.00	
Massillon, Ohio	2.50	2.50		2.50	2.50		
Michigan City, Ind.				.15@ .30			
Mineral Ridge and Ohlton, Ohio	1.75*	1.75*		2.50	1.75*	1.75*	
Montoursville, P'n.				1.25@1.35			
New Lexington, O.	2.00	1.50					
Ottawa, Ill.		.75@1.00†					
Red Wing, Minn.	1.25		1.25	1.50	1.50	3.50	1.50
Ridgeway, Penn.	1.50	1.50		2.00@2.50			
Round Top, Md.	1.25			1.60		2.25	
San Francisco, Calif.	3.50	4.75	3.50	3.50@5.00	3.50@4.50	3.50@5.00	
Tamalco, Ill.		1.50@1.75					
Tamms, Ill.	Ground silica per ton in carloads—20.00@31.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.65	.75		.75	.75		
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	1.75*@2.25	1.75*		1.75*@2.25			
Zanesville, Ohio	2.00‡	1.50‡	2.00‡		2.00		

*Damp. †Crude silica, crushed and screened, not washed or dried. ‡Plus 75c per ton for winter loading.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium nd Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.45*	1.80*	1.45*		1.45*	
Jackson, Ohio		1.05*		1.30*	1.30*	1.30*	1.30*
Toledo, Ohio	1.50	1.25	1.50	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55*		1.55*	1.55*	1.55*	1.55*
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.		.80		1.25	.90@1.05	.90	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.20
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95d
Chazy, N. Y.	12.50	10.50	8.00	12.00	11.50	16.50	10.00	2.50_2
Lime Ridge, Penn.							5.00a	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00t
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	11.50			8.50	1.65i
CENTRAL:								
Afton, Mich.					8.50	1.61		
Carey, Ohio	12.50	8.50@9.50	9.50		9.50		9.00	
Cold Springs, Ohio	12.50	8.50	8.50		9.00		8.00	
Delaware, Ohio	12.50	10.00	9.00	10.00			9.00	1.50
Frederick, Md.		10.00	9.50	10.00			7.50	1.45
Gibsonburg, Ohio (f)	12.50							
Huntington, Ind.		8.50	8.50		9.00	11.00	8.00	1.50c
Luckey, Ohio (f)	12.50							
Marblehead, Ohio		8.50	8.50		9.00		8.00	1.50c
Marion, Ohio		8.50						1.70d
Milltown, Ind.		9.00@10.00		10.00p	8.00_3			1.40r
Sheboygan, Wis.		11.50					9.50	
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00		
Wisconsin points (f)		11.50					9.50	
Woodville, Ohio	12.50	8.00	8.00	12.50	9.00	11.00	9.00	1.50
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Tex.							14.00	1.75
Graystone, Landmark and Wilmay, Ala.	12.50	10.00			8.50		8.50	
Keystone, Ala.	12.00	10.00	10.50	10.00	9.00		8.50	1.50u
Knoxville, Tenn.	12.50	10.00	10.00	10.00	8.50		8.50	1.50
Ocala, Fla.		14.00	10.00		13.00	1.60_1		1.70
WESTERN:								
Calcite, Colo.							9.25	
Kirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Dittlinger, Tex.		12.00@13.00					9.50p	1.50_4
San Francisco, Calif.	21.00	21.00	12.50@15.00	21.00			14.50	1.90v
Tehachapi, Calif.			8.00				13.00z	2.20x
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) steel; (e) per 180-lb. barrel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. net barrel 1.65; 280-lb. net barrel, 2.65 (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium; (p) to 10.50; (q) to 8.50; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (‡) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.60; (¶) to 10.00; (1) 80-lb. paper bags; (2) to 3.00; (3) to 9.00; (4) to 1.60.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Gray Summit and Klondike, Mo.	2.00	1.75
Mapleton, Depot, Penn.		2.00
Massillon, Ohio		2.25
Mineral Ridge and Ohlton, Ohio	*1.75@ 2.00	*1.75
Montoursville, Penn.		1.10
Ottawa, Ill.	1.25@ 1.50	
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50@ 4.50	3.50@ 4.50
Thayers, Penn.		2.25
Utica, Ill.	1.00	1.00
Warwick, Ohio		2.25
Zanesville, Ohio		2.50

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons	.08
per gross	1.25
Chatsworth, Ga.:	
Crude Talc	4.50
Ground (20-50 mesh), bulk	6.50@ 8.50
Ground (150-200 mesh), bulk	8.00@10.00
Pencils and steel worker's crayons, per gross	1.50
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	10.00@11.00
Including bags	11.00@12.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc	5.00
Ground talc (150-200) bags	10.00@12.00
Pencils and steel workers' crayons, per gross	1.00@ 1.50
Emeryville, N. Y.:	
(Double air floated) including bags; 325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bags	9.75@12.50
Joliet, Ill.:	
Ground talc (150-200) bags	30.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), bags	14.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.50@ 5.00
Mt. Pleasant, Tenn.—B.P.L. 72-75%	5.50@ 6.00
Tennessee—F.O.B. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@ 8.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 65%; bulk	7.25
Twomey, Tenn.—B.P.L. 65%	7.25

Florida Phosphate

(Raw Land Pebble)

(Per Ton.)

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	3.00
70% min. B.P.L., Basis 70%	3.25
72% min. B.P.L., Basis 72%	4.25
75/74% B.P.L., Basis 75%	5.00
77/76% B.P.L., Basis 77%	6.00

Mica

Prices given are net, F.O.B. plant or nearest shipping point.

Keene, N. H.—per ton, mine run	100.00@175.00
Dry, ground	37.50@120.00
Clean shop scrap	30.00@ 35.00
Mine scrap	25.00@ 30.00
20 mesh	37.50
40 mesh	45.00
60 mesh	75.00
100 mesh	100.00
Roofing mica	37.50
Cut mica per lb.	2.00@ 6.00
Punch mica, per lb.	.15
Pringle, S. D.—Mine run, per ton,	
Punch mica, per lb.	.05@ .07
Scrap, per ton, carloads	19.00@ 20.00

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Buckingham, Que.—Buff stucco dash		‡12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Penn. — Green bags included	18.00@20.00	18.00@20.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio — Concrete facings and stucco dash		6.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury and Brandon, Vt.—Middlebury white		‡9.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Calif. — "Natrock" roofing grits		12.00@16.00
Tuckahoe, N. Y.		12.00
Villa Grove, Colo.		13.00
Warren, N. H.—cement facing (mica), per ton		7.50
Wauwatosa, Wis.		16.00@45.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

†C.L.
*C.L. including bags; L.C.L. 14.50.
‡C.L. including bags, L.C.L. 10.00.

Potash Feldspar

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Bath, Me.—Color, white; analysis, potash, 12%; 100% thru 180 mesh, bags, 21.00; bulk	18.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 95% thru 80 mesh	18.00
Finer grades	20.00@23.00
Erwin, Tenn.—Color, white; analysis, 12.07% K_2O, 19.34% Al_2O_3; Na_2O, 2.92%; SiO_2, 64.76%; Fe_2O_3, .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Glen Tay Station, Ont., color, red or punk; analysis: K_2O, 12.81%, crude, bulk	6.00@ 7.50
Los Angeles, Calif.—Color, white; analysis, K_2O, 10.35%; Na_2O, 3.62%; Al_2O_3, 18.71%; SiO_2, 65.48%; Fe_2O_3, .17%; 100% thru 150 mesh, bags included, C.L.	22.00
Bulk	20.00
Murphsboro, Ill.—Color, snow white; analysis SiO_2, 64.4%; K_2O, 13%; Na_2O, 2.5%; Fe_2O_3, 0.07%; Al_2O_3, 19.3%; 98% thru 200 mesh, bags	21.00
Bulk	21.00
Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toughkenamon, Pa.—Color, white to light cream; 98% thru 150 mesh, bags, 11.00@13.00; bulk	10.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk (Bags 11 cents each, non-returnable)	16.00
Wheeling, W. Va.—Color, white; analysis, K_2O, 9.50%; Al_2O_3, 16.70%; Na_2O, 3.50%; SiO_2, 69.50%; 99% thru 140 mesh, bulk	19.00

Blended Feldspar
(Pulverized)

Tenn. Mills—Bulk .... 16.00@20.00

Chicken Grits

Afton Mich. (limestone) per ton	10.00
Belfast and Rockland, Me.—(Limestone), bags, per ton	‡10.00
Brandon and Middlebury, Vt., per ton	12.00‡
Centerville, Iowa (gypsum) per ton	18.00
Los Angeles Harbor (limestone), 100-lb sack, 1.00; sacks, per ton, 8.50@9.50†; bulk, per ton	6.00@7.00†
Toughkenamon, Pa.—(Feldspar) 100-lb. bags, 1.00; bulk, per ton	10.00
Danbury, Conn., Rockdale and West Stockbridge, Mass. — (Limestone) bulk	7.50@9.00*
Gypsum, Ohio.—(Gypsum) per ton	10.00
Limestone, Wash. (limestone) per ton	12.50
Rocky Point, Va. (limestone) 100 lb. bags, 75c; sacks, per ton, 6.00 bulk	5.00
Seattle, Wash.—(Limestone), bulk, per ton	12.50
Warren, N. H.—(Mica) per ton	7.80
Waukesha, Wis.—(Limestone), per ton	7.00

*L.C.L.
†Less than 5-ton lots.
‡C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass	14.50
Brighton, N. Y.	*19.75
Dayton, Ohio	12.50@13.50
Detroit, Mich.	†‡17.50
Farmington, Conn.	16.00
Flint, Mich.	¶12.50@16.00
Grand Rapids, Mich	12.00
Hartford, Conn.	*19.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.50
Madison, Wis.	11.00
Michigan City, Ind.	12.00
Milwaukee, Wis.	*13.00
Minneapolis and St. Paul, Minn.	11.25
New Brighton, Minn.	10.00
Pontiac, Mich.	12.50@13.50
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.00@12.50
Sebewaing, Mich.	12.00
Syracuse, N. Y.	20.00
Terra Cotta, D. C.	13.50
Toronto, Canada	12.00
Wilkinson, Fla.-White	12.00
Buff	16.00

*Delivered on job. †Delivered in city limits.
‡Less 5%. ¶Dealers' price.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.47
Atlanta, Ga.		2.35
Baltimore, Md.		1.70@2.35
Birmingham, Ala.		2.30
Boston, Mass.		1.81@2.63
Buffalo, N. Y.		1.67@2.38
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa		2.34
Charleston, S. C.		2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio		2.37
Cleveland, Ohio		2.29
Chicago, Ill.		2.10
Columbus, Ohio		2.34
Dallas, Texas		2.10
Davenport, Iowa		2.29
Dayton, Ohio		2.38
Denver, Colo.	.66¼	2.65
Detroit, Mich.		2.15
Duluth, Minn.		2.09
Houston, Texas		2.60
Indianapolis, Ind.		2.29
Jackson, Miss.		2.60
Jacksonville, Fla.		2.50
Jersey City, N. J.		1.85@2.33
Kansas City, Mo.		2.02
Los Angeles, Calif.	.61†	
Louisville, Ky.		2.27
Memphis, Tenn.		2.60
Milwaukee, Wis.		2.25
Minneapolis, Minn.		2.32
Montreal, Que.		1.90
New Orleans, La.		2.40
New York, N. Y.		1.77@2.25
Norfolk, Va.		2.17
Oklahoma City, Okla.		2.56
Omaha, Neb.		2.51
Peoria, Ill.		2.27
Philadelphia, Penn.		1.85@2.41
Phoenix, Ariz.		3.70
Pittsburgh, Penn.		2.09
Portland, Colo.	.72½	2.90
Portland, Ore.		2.90
Reno, Nevada	.75¼	3.01
Richmond, Va.		1.69@2.44
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.		2.31
Savannah, Ga.		2.50
St. Louis, Mo.	.55	2.20
St. Paul, Minn.		2.32
Seattle, Wash.	10c discount	2.65
Tampa, Fla.		2.60
Toledo, Ohio		2.20
Topeka, Kans.		2.40
Tulsa, Okla.		2.43
Wheeling, W. Va.		2.17
Winston-Salem, N. C.		2.79

NOTE—Add 40c per bbl. for bags.
†Delivered on job in any quantity, sacks extra.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.85
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.05
Detroit, Mich.		2.15
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Leeds, Ala.		1.95
Mildred, Kans.		2.35
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Steelton, Minn.		1.90
Toledo, Ohio		2.20
Universal, Penn.		1.85

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agri-cultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft.	—Plaster Board— ⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Arden, Nev. and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u					11.70u			
Centerville, Iowa	2.50	12.00m	12.00m	7.00	8.00	8.50	10.00		25.80	10.00			
Detroit, Mich.‡				11.30	11.30	11.30		8.00					
Delawanna, N. J.								9.00@9.40			.14@.15s	.15@.16s	40.00
Douglas, Ariz.			7.00			15.50d	18.50		30.00	15.50			
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50		24.55	20.00			
Gypsum, Ohio‡	3.00	4.00	6.00	7.00	9.00	9.00	19.00	7.00	27.00	19.00		15.00	30.00
Hanover, Mont.				11.80									
Los Angeles, Calif.				10.30k									
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00		20.00	30.00
Portland, Colo.				10.00									
San Francisco, Calif.				13.40r	14.40r		15.40r						
Seattle, Wash.	6.50		11.00	16.00									
Sigurd, Utah									18.00a				
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00					20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross; (d) hair fibre; (f) delivered; (h) delivered in six states; (i) delivered on job; (k) sacks 12c extra, rebated; (m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50; (u) includes sacks.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City of shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	....	....
Columbus, Ohio	.16@.18a	....	....
Detroit, Mich.	19.00‡	....	28.00‡
Forest Park, Ill.	18.00*	23.00*	30.00*
Grand Rapids, Mich.	.16	....	....
Graettinger, Iowa	.18@.20	....	....
Indianapolis, Ind.	.13@.15†	....	....
Los Angeles, Calif.¶	6x3½x12—50.00; 8x3½x12—60.00		
Oak Park, Ill.	.18@.21a	....	....
Olivia and Mankato, Minn.	9.50b	....	....
Somerset, Pa.	.20@.22	....	....
Yakima, Wash.	20.00*	....	....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton.

Cement Roofing Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	**15.00**
Green	**18.00**
Cement City, Mich. — 5"x8"x12", per M	**55.00**

Cicero, Ill.—Hawthorne roofing tile, per sq.

	Chocolate Red and Orange	Yellow, Tan Green and Blue	Slate Gray
French and Spanish†	$11.50	$13.50	$12.75
Ridges	.25	.35	.30
Hips	.25	.35	.30
Hip starters	.50	.60	.60
Hip terminals, 2-way	1.25	1.50	1.50
Hip terminals, 4-way	4.25	5.00	5.00
Mansard terminals	2.50	3.00	3.00
Gable finials	1.25	1.50	1.50
Gable starters	.25	.35	.30
Gable finishers	.25	.35	.30
*End bands	.25	.35	.30
*Eave closers	.06	.08	.06
*Ridge closers	.05	.06	.05

*Used only with Spanish tile.
†Price per square.

Houston, Texas.—Roofing Tile, per sq.

Red	**17.00**
Green	**19.50**
5x4x12 (Lightweight)	**45.00**
5x8x12 (Lightweight)	**80.00**
Indianapolis, Ind.—9"x15"	
Gray	**10.00**
Red	**11.00**
Green	**13.00**

Longview, Wash.—(Stone Tile)	Per 1000
4x6x12	55.00
4x8x12	**65.00**
Mt. Pleasant, N. Y.:	**Per 1000**
5x8x12	**78.00**
Pasadena, Calif.—(Stone Tile	Per 100
3½x4x12	3.00
3½x6x12	5.00
3½x8x12	6.00
Wildasin Spur, (Building Tile) Los Angeles, Calif.:	
4x3½x12	**.03½**
6x3½12	**.04½**
8x3½x12	**.05½**
Yakima, Wash.—Building tile:	
5x8x12	.10

Cement Building Tile

Chicago, Ill.—per sq.	**20.00**
Detroit, Mich.—5x8x12, per 100	8.50

Cement Drain Tile

Grand Rapids, Mich.:	**Per 1000**
5x8x12	**70.00**
Graettinger, Iowa drain tile per 100 ft.	
5-in	4.50
6-in	5.60
8-in.	9.00
10-in.	12.00
12-in.	17.50
‡Delivered.	
14-in.	25.00
16-in.	35.00
18-in.	45.00
20-in.	60.00
22-in.	70.00
24-in.	80.00
30-in.	100.00
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile per ft.:	
3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waco, Texas:	**Per sq.**
4x4	**.60**

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	**17.00**	
Ensley, Ala. ("Slag-tex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	20.00	....
Milwaukee, Wis.	15.00	33.00@42.00
Mt. Pleasant, N. Y.		**14.00@23.00**
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	**12.50**	
Philadelphia, Penn.	**†15.25**	**‡21.50**
Portland, Ore.	17.00	25.00@75.00
Prairie du Chien, Wis.	14.00	22.50
Rapid City, S. D.	18.00	25.00@40.00
Waco, Texas	**16.50**	**32.50@125.00**
Watertown, N. Y.	20.00	35.00
Wauwatosa, Wis.	14.00	20.00@42.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	**22.50**	....

†Gray. ‡Red.

Portland Cement Association Opens Office at Lincoln, Nebraska

THE Portland Cement Association announces the opening of an office at 939 "O" street, Lincoln, Neb., under the direction of Donald D. Price, district engineer. This office has charge of association work in Nebraska.

Mr. Price has been connected with the Portland Cement Association for the past year and a half as field engineer.

Eddyville Sand and Gravel Company Plant and Holdings Sold

THE Iowa Sand and Gravel Co., Oskaloosa, Iowa, has purchased the real estate holdings and one of the plants of the Eddyville Sand and Gravel Co., Eddyville, Iowa. The latter company has been in the hands of a receiver for the past year. The plants owned by them were built at a cost of about $250,000, but the operation proved unsuccessful and was consequently discontinued. The original plant has been dismantled and the equipment sold. The plant which the Iowa Sand and Gravel Co. purchased is a later plant, officials of the company state, that it was purchased on a junk basis and that it may be dismantled at a later date.

Kentucky Rock Asphalt Company Sold

THE Kentucky Rock Asphalt Co., Louisville, Ky., with mines in Edmonson county, has been sold to Caldwell and Co. of Nashville, Tenn., supposedly representing eastern interests. The deal for the rock asphalt company, it is announced, involves $1,340,000 cash and an equal amount in preferred stock.

The purchasers paid $100 per share for stock of the company and in addition the Kentucky Rock stockholders are to receive for each share of their holdings a share in the new company of 7% preferred stock. In addition to this $1,340,000 7% stock which goes as part of the purchase price, Caldwell and Co. will issue $2,000,000 in bonds for the new company. The Kentucky Rock Asphalt Co. is a Louisville organization. Wiley B. Bryan is the president; W. H. Tarvin, secretary-treasurer.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.	$14.00 per ton																
Graettinger, Iowa	.04½d	.05½	.08½	.13	.17½	......	.50	.60	.75	.85	......	......	......	......	......	......	......
G'd Rapids, Mich. (b)	......	......	......	.60	.72	1.00	1.28	......	......	1.92	2.32	3.00	4.00	5.00	6.00	......	......
Houston, Texas	......	.19	.24	.43	.55½	.90	1.30	......	†1.70	2.20	......	......	......	......	......	......	......
Indianapolis, Ind. (a)	......	......	......	.80	.90	1.10	1.30	......	......	1.70	......	2.70	......	......	......	......	......
Longview, Wash.	Sewer pipe 40% off list, culvert—list																
Mankato, Minn. (b)	......	......	......	......	......	......	......	......	......	1.50	1.75	2.50	3.25	4.25	......	......	......
Olivia & Mankato, Minn.	12.00 per ton																
Paullina, Iowa‡	......	......	......	......	......	......	......	2.25	......	2.11	......	2.75	3.58	......	6.14	......	7.78
Somerset, Pa.	......	......	......	......	80[1]	1.00[2]	1.40[3]	......	......	2.00[4]	......	3.25[5]	4.00[6]	6.00[7]	......	......	——
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.80	......	......	......	......	......	......	......	......	......	——
Tiskilwa, Ill. (rein.) (a)	......	......	......	.65	.75	.85	1.10	1.60	......	1.90	......	......	3.40	......	......	......	——
Wahoo, Neb. (b)	......	......	......	......	1.00	1.13	1.42	......	......	2.11	......	2.75	3.58	4.62	6.14	6.96	7.78
Waukesha, Wis.	12 in. to 60 in. 18.00 per ton																
Yakima, Wash.	$10.00 per ton																

***30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced.**
†21-in. diam. ‡Price per 2 ft. length. (d) 5 in. diam. [1]@1.08. [2]@1.25. [3]@1.65. [4]@2.50. [5]@3.85. [6]@5.00. [7]@7.50.

Southern California Rock Products Association Organized

THE Pacific Coast Sand and Gravel Association held a meeting at the Johnathan Club in Los Angeles on March 4 to celebrate its first half-year's operation and to adopt a constitution and by-laws. The name of the association has been changed to the Southern California Rock Products Association.

E. Earl Glass, general manager of the association, writes that the membership list now includes every rock producer in the territory and that remarkable progress has been made in bettering conditions in the industry. The principal activity at present is the promotion of construction which will develop a market for the output of existing plants up to their capacity. The following officers were elected:

President, W. J. Van Valkenburgh, Blue Diamond Co.; vice-president, C. B. Rogers, Reliance Rock Co.; secretary-treasurer, Frank Gautier, Consumers Rock and Gravel Co.; general manager, E. Earl Glass. Members of the executive committee: W. J. Van Valkenburgh, Blue Diamond Co.; Frank Gautier, Consumers Rock and Gravel Co.; Guy R. Varnum, Big Tejunga Rock and Gravel Co.; Paul Graham, Graham Bros., Inc.; O. V. Barkman, Orange County Rock Co.; C. B. Rogers, Reliance Rock Co.; G. A. Rogers, Union Rock Co.; E. G. Hotchkiss, Builders Crushed Rock Products Co.; G. W. Preston, Preston Rock Co.

The constitution and by-laws which were adopted follow.

The executive committee of the association were recently guests of Graham Bros. at Avalon on Catalina Island and inspected the well-known quarry and rock crushing plant which Graham Bros. operate. The accompanying picture was taken on that occasion.

Well known members of the Southern California Rock Products Association. Reading from left to right they are, top row: William Gowan, Graham Bros., Inc.; T. F. Fournier, Big Tejunga Rock and Gravel Co.; O. V. Barkman, Orange County Rock Co.; Guy R. Varnum, Big Tejunga Rock and Gravel Co.; F. J. Gay, Consumers Rock and Gravel Co.; Paul Graham, Graham Bros., Inc. Seated: Frank Gautier, Consumers Rock and Gravel Co.; F. Gay, Sr., Consumers Rock and Gravel Co.; Kay Grier, Blue Diamond Co.; E. Earl Glass, general manager, Southern California Rock Products Association; G. W. Preston, Preston Rock Co.; C. B. Rogers, Reliance Rock Co.

CONSTITUTION OF THE SOUTHERN CALIFORNIA ROCK PRODUCTS ASSOCIATION

The name of this association, which is a voluntary, non-profit, unincorporated association, shall be Southern California Rock Products Association.

The objects of this association shall be:

To promote and extend the use of the products of the industry.

To provide an organization for the co-operation of the members and the co-ordination of their efforts with those of other trade associations and with governmental agencies in the furtherance of all projects affecting the industry.

To establish and to maintain the highest standards of business practices, customs and usages among its members, and to protect the interests of the industry.

To study problems relating to the production, transportation and marketing of rock products.

BY-LAWS OF THE SOUTHERN ROCK PRODUCTS ASSOCIATION

Article 1—Membership

Section 1. Any person, firm or corporation engaged in the production of crushed rock, sand or gravel shall be eligible to membership in this association.

Sec. 2. Application for membership shall be made in writing to the association. Each application shall be approved by the membership at any regular meeting by a vote of two-thirds of the members present and voting. Membership shall not be withdrawn except after two weeks' notice in writing addressed to the association and the payment of current dues.

Sec. 3. Any member may be suspended or expelled for any cause deemed good and sufficient by the executive committee after a hearing at which the member shall have an opportunity to be heard. Any member who shall be delinquent for a period of longer than 60 days shall be automatically suspended as a member until such time as all arrears in dues shall be paid. A vote of two-thirds of all the executive committee shall be necessary to suspend or expel.

Article 2—Officers

Section 1 The elective officers of the association shall be a president, vice-president and secretary-treasurer, who shall be elected by the majority vote of the membership at the first regular meeting in March of each year, to take office immediately, and shall serve for one year or until their successors are elected. When any office becomes vacant it shall be filled by a vote of the executive committee for the unexpired term.

Sec. 2. The duties of the officers shall be those customarily performed by such officers and such other duties as shall from time to time be delegated to them by the membership.

Sec. 3. Nominations of candidates for all elective offices to be filled at the annual meeting of the association shall be made by a nominating committee, and the members of the association shall be notified in writing of such nominations, such notices to be mailed at least 10 days prior to the annual election. Such nominating committee shall be appointed by the president and shall consist of two members of the executive committee other than the president, vice-president and secretary-treasurer and two members of the association who are not members of the executive committee. Other nominations of candidates for all such elective offices may be made, however, at the annual meeting of the association by members from the floor.

Article 3—Executive Committee

Section 1. The affairs of the association shall be conducted by an executive committee, subject to the by-laws of this association, and also subject to the specific and special instructions of the membership of the association. The executive committee shall consist of the three elective officers of the association and six additional members elected at the annual meeting. Members of the executive committee shall be elected for the term of two years except that the terms of office of five members of the first committee elected shall expire March 1, 1926, their successors to serve for two years thereafter, thus providing alternation in office. Vacancies in memberships of the executive committee shall be filled by a vote of said committee for the unexpired terms.

Sec. 2. The president shall preside at all meetings of the executive committee and shall appoint all committees thereof.

Sec. 3. The manager shall be a paid official who shall receive a salary to be determined by the executive committee. He shall conduct all official correspondence, preserve all records and communications and record the proceedings of this organization and of the executive committee. He shall perform all duties assigned by the executive committee and shall appoint, dismiss and supervise all employes.

Article 4—Meetings

Section 1. There shall be at least one meeting of the association monthly, of which each member shall be notified at least 24 hours in advance. Special meetings of the association may be called by the president or by any three members of the association in good standing at any time upon three days' notice in writing. A majority of the membership shall constitute a quorum for the transaction of business. The first meeting in March of each year shall be the annual meeting of the association.

Article 5—Finances

Section 1. Funds of the association shall be secured by an assessment on each member; the rate of assessment shall be determined by the membership.

Sec. 2. The assessment shall be due and payable in such manner as the executive committee may from time to time determine.

Sec. 3. Funds of the association shall be disbursed by the manager upon approval by the president. The manager and members of the executive committee with power to sign checks or expend funds shall be under bond to the association.

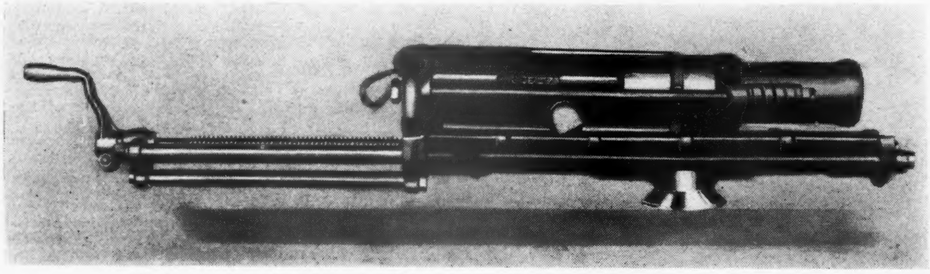
Article 6—Amendments

Section 1. The constitution and by-laws may be amended at any regularly called meeting of the association by a two-thirds vote of the membership. Any such amendment shall not take effect until it receives a two-thirds favorable vote of the membership at a second and subsequent regularly called meeting of the association.

New Machinery and Equipment

New Pneumatic Rock Drills

THE Denver Rock Drill Manufacturing Co. announces the addition of two new rock drills to its "Waugh" line.



Pneumatic rock drill

In the Model 7 "Waugh" drifting drill, the manufacturers claim a pneumatic hammer drill of simple and symmetrical construction, of conservative design and in which many original features have been incorporated. The drill steel is rotated through ratchet, pawl, and rifle bar. The valve is of the tubular type and operates axially in the machine, and completely housed within the cylinder.

Drop forgings and high-grade alloy steels heat treated, are used throughout. Provision is made for easy replacement of parts ordinarily subjected to heaviest service and excessive wear. The ratchet ring and pawls are reversible, a feature which is said to prolong their life.

Lubrication is effected by the Waugh automatic air line oiler, by which oil chambers, packings, plugs and other parts in the machine proper are eliminated.

The Model 17 is similar in design to the Model 7, but is heavier and more powerful.

New Pulverizing Mill

THE Bradley Pulverizer Co., Allentown, Penn., announce an improved type of Hercules mill for the pulverizing of limestone and cement clinker. The mill functions as a preliminary pulverizer in the cement industry, generally being used ahead of the finishing tube mill.

The grinding principle of the Hercules mill consists of three rolls revolving against the inner surface of the annular rings where the crushing is done by the centrifugal action of the rolls. The grinding rolls run on lubricated bearings, with all lubricated parts thoroughly protected from grit and dust.

The mill is so designed that material is fed before each roll, allowing each grinding roll to take care of its proportionate amount of material as it is fed into the mill. This is said to prevent undue strain on any one part of the mill.

The material after being ground to the desired fineness leaves the mill through an internal screen down through the foundation and is taken care of by a suitable conveyor. The fineness is said to be uniform at all times, as the material does not leave the mill until ground to the fineness desired, same being controlled by the size of the screen used in the mill.

Details of mill with casing removed showing construction

In the improved Hercules mill the screen area has been increased 10% and the port discharge area 50%. The height of the mill

Detail of mill showing mill drive

Detail showing feeder operated by direct motor drive

has been reduced 18 in., lowering the center of gravity and reducing vibration.

The mill is driven by a 350 h.p. motor direct-connected through a flexible coupling to the pinion shaft, which has been increased in size to take care of the additional horsepower. A screw gland stuffing box on the pinion shaft makes it absolutely oil-tight.

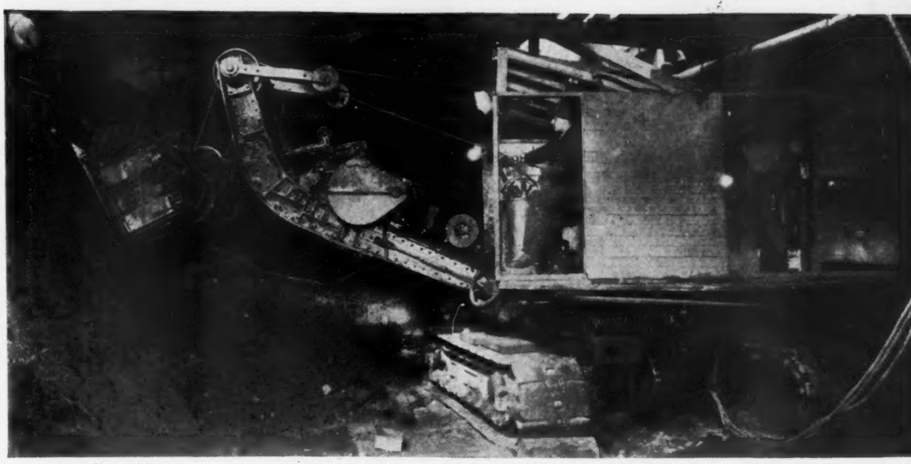
The main vertical and roll shaft have also been increased in size; the lubrication of the roll shaft improved. Roller bearings are used in place of bronze collars to take care of the thrust.

The feeder mechanism was redesigned so as to be driven by a separate motor mounted directly on the side member of the mill. The entire feeder mechanism, including drive, it is said, can be removed as a unit. All moving parts of the feeder are carried in ball and roller bearings with hardened steel races. The feeder has a positive and definite scraper lever adjustment by use of machine cut teeth in the quadrant and a spring actuated ratchet. An oversize flexible coupling is used between the motor and the feeder.

New Power Shovel for Underground Work

A TYPE of power shovel that is likely to be useful in any industry under certain conditions is the Marion standard type 21 with bow-type boom, made by the Marion Steam Shovel Co., Marion, Ohio.

It is used chiefly in underground work such as in tunnels where the headroom is limited. The electric shovel shown in the illustration was used in a Brooklyn subway project where there was said to be only about 11 ft. of headroom. It is claimed by the makers that because of the short boom and dipper stick and consequent shortage of its swing, cars are loaded with great rapidity.



Power shovel for use in close quarters

Standard types of shovels, it is said, can be converted into this special type just by the use of the special boom shown in the accompanying illustration and such conversions require no change from the standard operation, the same controls being used as with the conventional type of boom.

New Steam Generating Unit

A STEAM generating unit said to expose practically all the boiler heating surface to radiant heat and which, through firing by pulverized fuel eliminates the usual large furnace required on ordinary boilers, has been developed by the Construction Engineering Corp. of New York.

The steam generator unit consists of a furnace, the walls of which are composed of tubes of the fin type, all exposed to radiant heat. Pulverized fuel is introduced through burners in the four corners and burned in a turbulent condition in the form of a vortex, due to the fact that the primary mixture of fuel and air as well as the highly preheated secondary air enter tangentially to an imaginary circle.

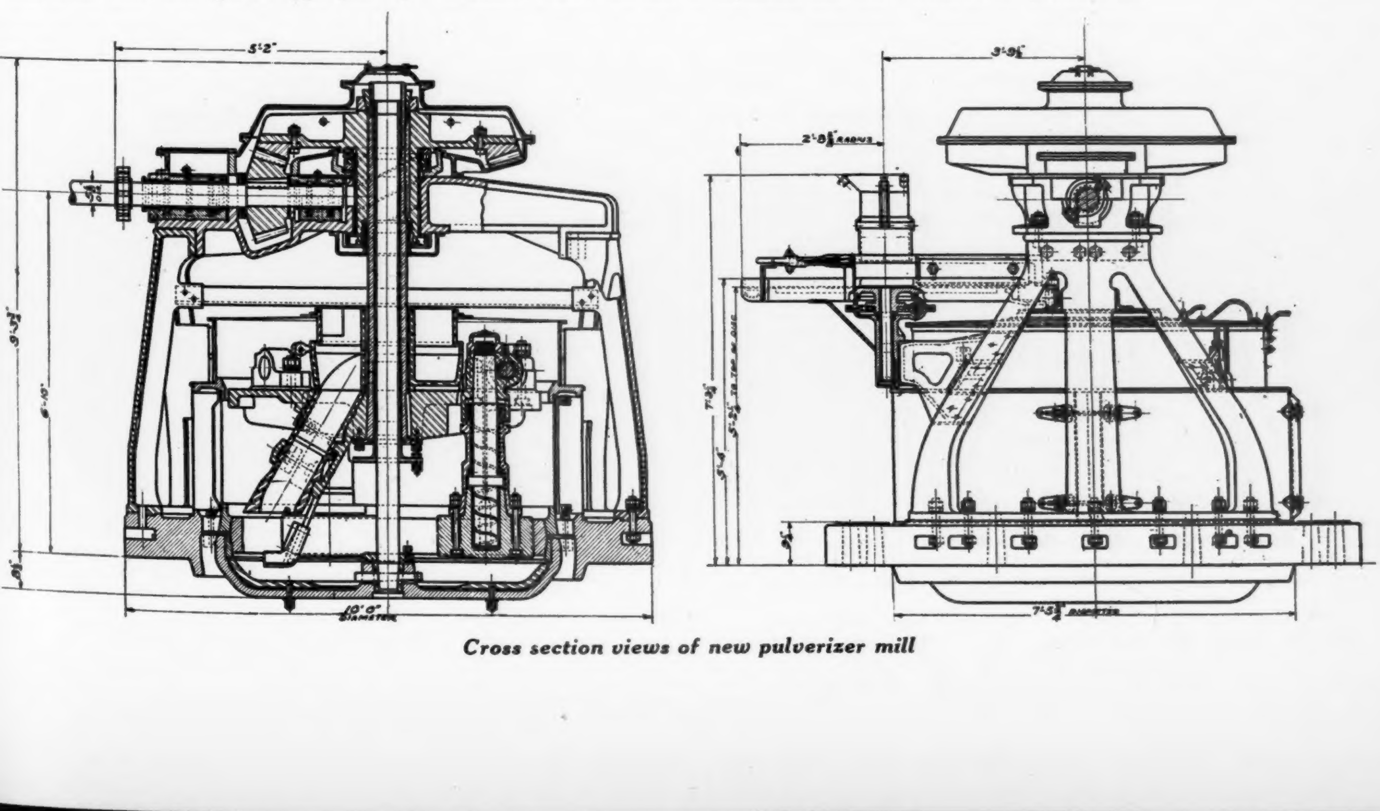
The flame and gases descend through a multi-tubular water screen into a settling chamber where the ash is deposited and the gases flow through a superheater, thence through an air preheater to the stack or to the induced draft unit.

It is claimed that the greatest saving due to the new steam generator will be in the cost of building and equipping the plant. This unit, it is said, can be installed in from one-half to two-thirds the space and in much less time required for present-day boiler units to produce the same amount of steam.

Allis-Chalmers Company Acquires Hoar Shovel Company

THE Hoar Shovel Co., of Duluth, Minn., announces the transfer of its business to Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

The Allis-Chalmers Manufacturing Co. will manufacture Hoar shovels and carry a complete stock of parts. Some of the personnel of the Hoar Shovel Co. will be in the employ of the Allis-Chalmers Co. and thus there will be no break in the service or acquaintance between present users of Hoar shovels and the source of production.



Cross section views of new pulverizer mill

News of All the Industry

Incorporations

Concrete Interlocking Tile Co., Baldwin Park, Calif.

Peninsular Brick & Tile Co., Tampa, Fla. T. J. Lowe and C. B. Adams.

Long Beach Composition Stone Co., Long Beach, Calif. Percy W. Hayes.

Tampa Sand & Material Co., Tampa, Fla. J. L. Core, River Terrace, Tampa.

Gilsonite Rock Asphalt Co., Wilmington, Del., $30,000. (Corporation Service Co.)

Globe Rock Asphalt Co., Wilmington, Del., $200,000. (Corporation Servicec Co.)

Centropolis Land & Rock Co., St. Louis, Mo. J. A. Tobin, 4172 Eaton St., and others.

Northwest Tile Co., Inc., Seattle, Wash., $6,000. H. Braida, John Braida and F. A. Hawks.

J. L. McKinney Sand Co., Mt. Holly, N. C., $10,000. J. L. and W. L. McKinney.

Egyptian Stucco Manufacturing Co., Portland, Ore., increased capital stock to $25,000.

Hillsboro Sand Co., Tampa, Fla., $24,000. E. E. Hennie, D. G. Roof and others.

Union Concrete Tile Corp., Lake Worth, Fla., $25,000. A. E. Burroughs and N. G. Varner.

Pocono Concrete Products Co., Wilmington, Del., $100,000. (E. Walter Hall, Wilmington.)

Thomas-Rooks Road Material Co., Williston, Fla., $25,000. M. M. Thomas and F. J. Rooks.

Marble Face Brick Co., New Smyrna, Fla., $20,000. G. N. Means, H. W. Houston and others.

Ohio Stone Products Co., Wilmington, Del., $100,000. Deal in road material known as Amiesite.

Pioneer Sand & Gravel Co., Seattle, Wash., increased capital stock from $1,000,000 to $2,000,000.

Georgia Portland Cement Corp., Dover, Del., $5,000,000. H. M. Nell, Augusta, Ga. (Colonial Charter Co.)

Hart Concrete Construction Co., St. Petersburg, Fla., $10,000. J. H. Lodwick, 75 15th Ave. S., and others.

Main Art Stone & Tile Co., Los Angeles, Calif., $100,000. W. E. Patterson, F. E. Malonee and Wm. Unter.

Gray Knox Marble Co. of Delaware, Wilmington, Del., $100,000. Texas agent: I. D. White, Austin.

James Sand & Gravel Co., Paducah, Ky., $75,000. J. E. James, H. E. Richardson and J. K. Ferguson.

Rock & Sand Sales Co., Miami, Fla., $50,000. T. E. Turner, 207 Greenway Drive, Coral Gables, Fla., and others.

Dayton Gravel & Sand Co., Dayton, Ohio, $10,000. E. W. Campbell, W. F. Lee, Esther Rehmund and others.

Stone Tile Manufacturing Co., Asheville, N. C., $50,000. B. W. English, 35 Panola St., and George F. Rutzler.

Buck Hill Washed Sand & Gravel Co., Canton, Ohio, $50,000. H. C. Taylor, W. G. Ashbrook, H. M. Legst and others.

Cem-Art Tile & Mantel Co., Los Angeles, Calif. Adolph T. Ashburn, 2423 W. Washington St., Los Angeles, Calif.

Worthey Cement Crib & Silo Co., Mankato, Minn., $60,000. Ralph Worthey of Monterey and Ray T. Stout of Mankato.

Sunset Staff & Stone Works, Inc., Los Angeles, Calif., $20,000. Richard Rodriguez, LeRoy F. Irwin and Ira D. Brett.

North Dakota Concrete Products Co., Mandan, N. D., $50,000. D. W. Longfellow, and H. A. Merrifield of Hankinson N. D.

Producers Core Sand Co., Michigan City, Ind., $10,000. E. L. Spraker, W. H. Westphal, Carl Zeese, C. H. Manny and others.

Mooresville Gravel Co., Mooresville, Ind., $10,000. J. N. Morgan, J. M. Manker and W. A. Hadley. To operate a sand and gravel pit.

Contile Co., Inc., New Orleans, La., $75,000. To manufacture tile and cement products. J. W. Farmer, 2127 Octavia St., New Orleans.

Dakota Hume Pipe Co., Sioux Falls, S. D., $50,000. E. M. ReQua, Delbert Wheeler and H. W. Stride. To manufacture concrete pipe, etc.

Bremen Cement Tile and Block Co., New Bremen, Ohio, $20,000. Frank Niekamp, A. and W. Scheer, Louis Huenkle and others.

Freestone Sand & Gravel Co., Johnson City, Tenn., $10,000. R. W. Pettigrew, C. L. Marshall, L. G. Marshall, R. E. Moore and Robert L. Taylor.

Jenkins-Burt Gravel Co., Fort Myers, Fla., $10,000. E. M. Jenkins, H. Burt and others. To establish a crushing plant of 200 ton daily capacity.

Marion County Sand & Gravel Co., Inc., Indianapolis, Ind. 150 shares of no par value. A. E. Eaton, Bascom O'Hair and Roland Lane. Digging for sand and gravel, etc.

Rockwell Lime Co., Chicago, Ill., increased capital stock from $2,500 to $200,000 and changed par value of shares. Correspondent: Litsinger, Healy & Reid, 1111 Conway Bldg., Chicago.

Kennedy Brick & Tile Co., Avon Park, Fla., $50,000. To establish a cement products plant of which the first unit capacity will be 30,000 brick and 10,000 building tile. W. P. Kennedy, W. F. Hunter and others.

Builders Wet Mortar and Supply Co., Chicago, Ill., $10,000. C. F. Baer, Samuel Simon and Thomas A. Rafferty. Correspondents: O'Brien & Hays, 123 W. Madison St., Chicago. Manufacture and deal in prepared mortar, sand, gravel, lime, bricks, stone, etc.

Concrete Specialty Co., Chicago, Ill., $30,000. Fred W. Karge, Fred H. Fricke, and Willard F. Armstrong. Correspondent: Charles H. Miller, Suite 1221, 105 W. Monroe St., Chicago. Manufacture and deal in building materials, articles of concrete, cement or similar products.

Quarries

Lewis & Sons, Tanner, Kans., will rebuild their crushing plant recently damaged by fire. All new equipment will be installed to be operated by electric power.

Nicholl Stone Co., Elyria, Ohio, which was recently organized, has purchased 35 acres in Kipton township and will soon begin quarrying operations at that place.

W. M. Orr's crushing plant, located near Balmorhea, Tex., was destroyed by fire recently. This plant was furnishing all the material used in ballasting the track of the Texas & Pacific railway between Barstow and Sierra Blanca.

The plant will be rebuilt at once and it is expected that operations will be held up for only a short time.

Ash Grove Lime & Portland Cement Co., Kansas City, Mo., are to erect a crusher at their plant west of Ash Grove, Mo. The company decided to do so in view of the expected demand for crushed stone in this district, due to the large amount of highway work and bridge construction to be carried on during the present year.

Sand and Gravel

Duo Sand and Gravel Co., West Palm Beach, Fla., has installed a steam shovel.

Missouri Sand & Gravel Co. has received permission from the city council of Louisiana, Mo., to operate a $100,000 plant at that place. The company was represented by J. L. Pierce and A. Leplten.

The machinery and materials for the building have been ordered and work will start as soon as they arrive.

Pilot Knob Sand & Gravel Co., Ashland, Ky., has been acquired by S. J. Debord and W. R. Forman of Ashland. It is planned to develop the company holdings in Powell and Montgomery counties, Ala.

Magna Sand Corp., Philadelphia, Penn., which was recently put into receivership (see ROCK PRODUCTS' Sept. 5 and Oct. issues for details) has been sold by public auction. Leander S. Russell purchased the plant at Hockessen, N. J., and contents for $850 and office effects for $170. Norman P. Crouch was the receiver.

Cement

The Texas Portland Cement Co. has moved its Houston offices to 1117 Houston Post-Dispatch Bldg.

Great Western Portland Cement Co., Kansas City, Mo., has returned $43,707 to the Missouri Highway Commission as a refund on profits on cement sold the state last year. This is in accordance with an agreement made in 1923 by which the state receives at cost price all cement purchased from the Great Western company.

Cement Products

F. W. Stanley, Fresno, Calif., has purchased the Adell Cement Pipe Works, South F St., Madera, Calif.

Auburn Concrete Products Co., Auburn, Wis., has added a steam curing room and other equipment to their plant. The plant capacity is expected to be doubled by these changes.

York and Roberts, Norristown, Penn., have started work on improvements to their plant which when completed will double its capacity. A Champion crusher and a Pennsylvania hammer mill crusher are to be installed along with other equipment.

Talc

W. H. Loomis Talc Corp., Gouverneur, N. Y., is planning to build an electric power plant on the Oswegatchie river in St. Lawrence county, near Gouverneur, N. Y. Arrangements for financing the project are likely to be made soon. Power from the plant will be used in the talc mills near by and surplus power will be sent over transmission lines to nearby points such as Watertown, N. Y.

Rock Asphalt

Alabama Rock Asphalt Co., Margerum, Ala., has under way extensive improvements to their plant which will increase capacity.

Miscellaneous Rock Products

W. D. Haden Co., Houston, Tex., is to establish a plant for crushing shells, on Simms Bayou.

Personals

Burt Fleeger, treasurer, sales manager and a director of Sivyer Steel Casting Co., Milwaukee, Wis., has resigned to become associated with Oklahoma Steel Castings Co., Tulsa, Okla., as vice-president.

Lawrence E. Buzard has been appointed general sales manager of the Fate-Root-Heath Co., manufacturers of Plymouth gasoline locomotives, Plymouth, Ohio, succeeding H. R. Sykes, who recently resigned.

Mr. Buzard, who was formerly assistant sales manager, has been with the company a number of years. He will have direct charge of locomotive sales and thirty-four district sales representatives.

H. E. Schellberg has sold out his interest in the Lyman Richey Sand Co., Omaha, Neb., to H. F. Curtis, president of the company. Mr. Schellberg was formerly vice-president and general manager of the company.

Howard W. Maxwell, vice-president of the Atlas Portland Cement Co., accompanied by Mrs. Maxwell, recently sailed on the Duilio which is making a special winter voyage through the Mediterranean and other seas.

A. T. Goldbeck, director of the Bureau of Engineering, National Crushed Stone Association, has been selected chairman of the committee on structural design of the Highway Research Board, National Research Council.

Thorne L. Wheeler of Arthur D. Little, Inc., Cambridge, Mass., has been appointed by Gen. Amos A. Fries as one of the consultants for the Chemical Warfare Service. Mr. Wheeler is a specialist in the activation of carbons which are used for gas masks.

J. T. Bellevue has become the superintendent of the new lime plant of the Black Marble and

Lime Co., Joseph, Ore. Mr. Bellevue has been connected with the lime industry for the past 30 years and was recently connected with the San Juan Lime Co., Port Angeles, Wash.

Herbert Stout, formerly with the U. S. Gypsum Co., is now in charge of the plaster mill of the Hongkong Excavation, Pile Driving and Construction Co., Ltd., Hongkong, China. The mill located at Tsun Wau in the British New Territories is operating day and night to complete large contracts.

Harlan A. Pratt has been appointed manager of the oil and gas engine department of the Ingersoll-Rand Co., New York. Mr. Pratt was connected with the sales department of the Westinghouse Electric and Manufacturing Co. and was also sales manager for the Atlantic Elevator Co., and the Elevator Supplies Co., of Hoboken, N. J.

Obituaries

Guy N. Wyckoff, for several years manager of the New Ulm Stone Co., of New Ulm, Minn., passed away recently in Rochester, Minn., where he had undergone an operation.

Horace Klinker, vice-president of the Plaster and Brick Sand Co., Seattle, Wash., died at a Seattle hospital of injuries received when he was buried by a cave-in at a gravel pit at which he was working.

Manufacturers

Arnold & Weigel, Woodville, Ohio, announce the following foreign representatives for "Arnold" vertical kilns, "Weber" batch hydrators, etc. Societe Aume Des Anciens, Establisements Raymond Freres, Paris, France; C. W. D. Rowe, Petersborough, England; Gilbert McAuliffe Pty., Ltd., Melbourne, Australia.

Climax Engineering Co., Clinton, Iowa, have appointed J. L. Latture Equipment Co., Portland, Ore., sales representatives for the states of Oregon, Washington and Idaho.

Hyman-Michaels Co., Chicago, Ill., have acquired all the rails and locomotives of the defunct Kansas City & Northwestern railroad. The equipment after dismantling of the railroad will be offered for public sale.

Robert W. Hunt Co., Chicago, Ill., have appointed their chemical engineer, F. O. Farey, manager of their Montreal officce, but have made no change in the personnel of their offices at Toronto and Vancouver.

Foote Bros. Gear and Machine Co., Chicago, Ill., have appointed T. R. Sanders, 180 Milk St., Boston, Mass., district representative to cover Rhode Island and the eastern half of Massachusetts.

Traylor Engineering and Mfg. Co., Allentown, Penn., have secured the contract from the Phoenix Portland Cement Corp., Birmingham, Ala., for two 10 and 11 ft. 3 in. x 343 ft. 9 in. kilns to be built on single roll supports. The kilns when placed in operation will be the largest in the world and unique in the fact that they are built on single roll supports.

Uehling Instrument Co., Paterson, N. J., announces the appointment of W. B. McBurney, 619 Trust Company of Georgia building, Atlanta, Ga., as representative for Georgia and eastern Tennessee.

Milwaukee Electric Crane and Manufacturing Corp., Milwaukee, Wis., announces the appointment of A. H. Ellison as district representative in the New York territory, with offices at 50 Church street, New York, and Byron B. Evans as representative for the Chicago territory, with offices at room 1434, 11 South La Salle street, Chicago.

Fuller-Lehigh Co., Fullerton, Penn., have secured the contract for two Randolph driers, two 46-in. Fuller-Lehigh pulverizer mills and three 6-in. Fuller-Kinyon pumps at the new Birmingham, Ala., plant of the Phoenix Portland Cement Corp.

Trade Literature

NOTICE—Any publications mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention Rock Products.

Power Scraper. Descriptive bulletin on the new Miami "one man" power scraper. Details of construction, design, cost comparison, etc. MIAMI TRAILER-SCRAPER CO., Troy, Ohio.

Crushing Rolls. Bulletin 1106 superseding R-2 giving complete information on Traylor crushing rolls. Illustrations and diagrams of parts. Tables and charts of capacities, etc. 42 pp. 8x11 in. TRAYLOR ENGINEERING & MFG. CO., Allentown, Penn.

Quarry and Pit Machinery. Catalog on full line such as conveyors, feeders, scrubbers, elevators, screens, etc. Details of design, capacities, specifications, etc. 24 pp. 8½x11 in. W. TOEPFER AND SONS CO., Milwaukee, Wis.

Labor on Erection Got About Half of New Building Cost in 1925

BUILDING construction has reached its maximum of activity in New York City, says the *Dow Service Building Reports.*

First quarter estimates for 1926 building activity in New York City show valuation higher than last year's record-breaking total. By volume, however, it indicates about 800 fewer projects as compared with the first quarter of 1925.

The inference that is likely to be drawn by building material manufacturers from first quarter building projections is that New York City will develop a bigger market for their products than last year. The tendency will be to increase building material production, at least until it is made clear that New York City building construction cannot go any faster than it went last year for the very simple reason that there are not enough skilled building artisans in New York City to enable it to go any faster.

The fact that first quarter volume of building projects is below that of 1925 is to be discounted because the first quarter of the year is always the time of fewest projections. It is a time in which the hang-over uncompleted building of the previous year is finished up in anticipation of the spring renting season. The largest volume develops in the second and third quarters and if the first quarter shows such a modest handicap as 800, it is a foregone conclusion that 1926 building projects will smash last year's totals both in volume and value.

Interest in this situation centers particularly in the relation it has to the supply of building material and labor and the ultimate bearing it will have upon manufacturing costs of building construction commodities. There is also some speculation as to just what would happen to the program to give state aid to housing in the next few years if the present type of building construction keeps up its pace and vast housing projects come into the market for labor and materials when it is absorbing about all that can be handled here now.

C. G. Norman, chairman of the Board of the Building Trades Employers Association points out that New York City last year practically reached its maximum of actual construction based upon the available supply of skilled man-power with which to do it.

His conclusion is that while New York City last year reported projects amounting to $1,024,000,000 not more than $720,000,000 actually was produced in that year. These conclusions are based upon the fact that there are in New York City approximately 125,000 skilled building construction workmen. At $10 a day, which is about the average pay of a building worker after days off are taken out of the calculation due to hot weather, wet weather, delays in delivery of material, etc., these 125,000 workmen would receive about $1,225,000 daily and for 280 working days a total of $360,000,000 a year, or 50% of the contract price for building construction. Counting building materials, equipment and appliances which these men assemble as the other 50% of the total of last year's building construction volume and the result is $720,000,000 in actual building.

It would therefore appear that no great volume of construction in excess of last year's records can be attained, under the existing supply of labor.

Building construction financing is proceeding cautiously. Money is cheap. It frequently happens that as old mortgages mature lower interest rates are requested and granted even by conservative savings banks, on well located properties. Lending institutions report many projects in contemplation for this year's development along Sixth avenue above Forty-Second street and in proximity to the East River above Forty-Fifth street great construction work is in contemplation. One notable project is a combination private boat dockage and apartment structure fourteen stories high extending two blocks.

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of ROCK PRODUCTS, published every other Saturday at 542 South Dearborn street, Chicago, Ill., for April 1, 1926. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the manager of ROCK PRODUCTS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Edmund Shaw; Managing Editor, Nathan C. Rockwood; Business Manager, Nathan C. Rockwood.

2. That the owners of 1 per cent or more of the total amount of stock are: W. D. Callender, T. J. Sullivan, Nathan C. Rockwood, Charles A. Breskin, and George M. Earnshaw, all at 542 South Dearborn street, Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

NATHAN C. ROCKWOOD,
Business Manager.

Sworn to and subscribed before me this 5th day of March, 1926.

(SEAL) CHARLES O. NELSON.
(My commission expires April 6, 1926.)